

COMPUTERWORLD

The Unix PC allure

DOS frustration forces R&D to 'open systems'

BY JAMES DALY
CW STAFF

While DOS may still rule the roost when it comes to corporate desktop operating systems, personal computer software houses are heeding the call of open systems and are increasingly renavigating their research dollars toward that old standby, Unix.

Many developers, frustrated with what they call the proprietary limitations of DOS and the muddy future of OS/2, are using Unix to cover their bets.

"Unix is no longer just for techies," said Dave Proctor, vice president of the database division at Ashton-Tate Corp. in Torrance, Calif. "Unix is moving rapidly toward the commercial market, and we intend to be ready for it."

Proctor said Ashton-Tate will deliver Unix versions of its Dbase IV database application for Sun Microsystems, Inc. workstations and systems using The Santa Cruz Operation's Unix version by the end of the quarter — before a product for the Apple Computer, Inc. Macintosh even arrives.

A variety of graphical user interfaces offering point-and-click

Continued on page 14

Time of reckoning

Increasing Unix presence on the desktop is attracting software firms

Number of PCs shipped running Unix

1989: 172,300

1990*: 198,000

1991*: 231,000

*Projected

Source: Datagroup, Inc.

Bush to push work-at-home

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Sometime in the next few months, President Bush is expected to deliver a public endorsement of telecommuting as "good for business" and good for relieving the nation's traffic, energy and pollution problems.

The president's staff has prepared an upbeat, one-page statement about work-at-home arrangements and is just waiting for the right time to go public, according to William Eagle, a staff member at the White House Office of Policy Development.

The White House endorsement may "open some corporations' eyes" and foster a climate in which more companies are willing to try telecommuting on an experimental basis, said Emi-

Home work

The number of company employees working at home during normal business hours is estimated to have increased 20% in 1990

Number of U.S. telecommuting employees (in millions)



Source: Link Resources Corp.

*Projected

ly Bassman, manager of human resources planning at Pacific Bell in San Ramon, Calif. Pacific Bell has more than 1,000 managers who telecommute at least one

day per week.

An early draft of the presidential statement praised the ability of computer and facsimile technology to move work to the people rather than moving people to the work. "Cars that don't leave the garage don't pollute the air or congest the freeway," it said.

The Bush administration has already launched a pilot "flexi-place" program for the federal government, which will assess the costs and benefits of telecommuting for as many as 2,000 federal employees.

The president's support may turn the federal government into

Continued on page 4

Hackers draw stiff sentences

Jail time sounds sharp note on tampering

BY MICHAEL ALEXANDER
CW STAFF

ATLANTA — The Nov. 16 sentencing of three computer hackers to terms in federal prisons and substantial restitution payments is the long-awaited stern warning that is needed to help quell high-tech tampering, law enforcers said.

Adam E. Grant, 23, and Franklin E. Darden, 24, each received a sentence of 14 months incarceration, including seven months to be spent in a halfway house. Robert J. Riggs, 22, received a 21-month jail sentence. All three were ordered to make restitution payments of \$233,000 each.

The three hackers were charged with repeatedly breaking into computers owned by Bellsouth Corp., eavesdropping on telephone conversations and stealing proprietary information, which they shared with other hackers.

The Chicago U.S. Attorney's office prosecuted Riggs on a separate charge for stealing a text file describing the operation of a Bellsouth 911 enhanced emergency system and uploading it to a bulletin board in Illinois. The Atlanta sentence included the Chicago charge.

Continued on page 99

JAPAN'S MAINFRAMERS

Long-term global strategies unfold

BY JEAN S. BOZMAN
CW STAFF
and LORI VALIGRA
IDG NEWS SERVICE

Japanese mainframe manufacturers, who have patiently sold their products through U.S. and European distributors since the 1970s, are preparing to step onto the European and U.S. selling fields to sell their computers directly to information systems managers.

Japanese mainframe makers will weave themselves into the global market fabric starting in the mid-1990s, industry analysts said. "They are expanding at a time when others are pulling back.



But taking market share will be a gradual process," said Mike Jeremy, an analyst at Baring Securities Ltd. in Tokyo.

"The international mainframe market should be a big part of our overall business," said Soji Endo, overseas operations manager at Hitachi Ltd. in Tokyo. "But so far, we haven't sold many computers outside Japan. Our overseas mainframe

business will be better in 10 years. We're waiting for the end of the current down cycle and for open systems to take hold."

Hitachi and its smaller counterpart, Fujitsu

Continued on page 100

Internet privatization adrift

BY J. A. SAVAGE
and GARY H. ANTHES
CW STAFF

Internet, the giant collage of research-oriented networks used by 3 million people in 35 coun-

tries, is evolving — perhaps clumsily — from a government-subsidized entity into a commercial one. Users and observers of the network liken the change to turning around a steamship with no captain to steer it — only tugboats pulling and prodding, sometimes in different directions.

The U.S. Senate recently passed a bill to partially fund a commercial replacement for Internet, but Congress plans to play a limited role in sorting out commercial issues, leaving them to users, commercial interests

and the federal agencies that now have responsibility for the Internet backbones.

Internet is about to achieve a critical mass in which growing use attracts commercial interests. "The telephone companies originally perceived no market, so the government has been in market-building mode for years," said Stephen Wolff, a division director at the National Science Foundation. "Now it's beginning to look interesting."

While most observers have no objection to "commercialization" of Internet, they said it raises difficult and troublesome issues that have not begun to be

Continued on page 12

INSIDE

Executive Report — The times demand greater versatility from IS staffs. Page 61.

As it did with the 386SX, Intel is expected to bring out a lower-cost, technologically revised version of the 486 chip next year. Page 6.

DEC closing Phoenix plant; may have to target its first official layoffs. Page 8.

Stock exchange automation pioneer Mary Jo Moccia dead at age 55. Page 8.

NEWSPAPER

*****5-DIGIT 48106
#U1U7E308M839068# 0010109208

UNIVERSITY MICROFILMS INT
UNIVERSITY MICROFILMS INT
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

0648

IN THIS ISSUE

NEWS

- 4** Intergraph makes a play for bankrupt Dazix, pressing its suit with cash and stock.
- 4** Groupe Bull chairman denies rumors of negotiations with NEC, although a Japanese takeover could be a blessing for the ailing French firm.
- 6** First Interstate Bank's Houston data center prepares to cash it in by the end of 1991 as part of a three-year consolidation plan.
- 8** Pioneer of stock exchange automation Mary Jo Moccia, 55, dies of a heart attack.
- 10** Versatile versions of Cadre's expanded set of CASE tools are trickling into the market.
- 12** 25-year Unisys customer CSI has confidence in Timeplex's ability to support itself should its parent sever the ties that bind.
- 99** While Midwest data centers aren't exactly quaking in their boots, many are making recovery site preparations in the event a predicted earthquake makes an appearance.
- 100** Fujitsu Chairman Takuma Yamamoto speaks candidly on the No. 1 Japanese mainframe maker's global strategies.
- 101** Unix is the equalizer that level's IBM's advantage in the computer market, according to Japanese vendors.

Quotable

"Hackers are trying to use the telecommunications industry as their playground. Well, the playground is closed."

WILLIAM COOK
ASSISTANT U.S. ATTORNEY

On the sentencing of three hackers. See story page 1.

SYSTEMS & SOFTWARE

- 29** Bull makes a strategic charge into the CASE arena with the announcement of a coming suite of Intel i486-based software products.
- 33** Gerber has been growing up since the birth of its IBM AS/400 installation, which replaced a System/36.

PCs & WORKSTATIONS

- 37** Different strokes for different folks: Consider your applications and number of users to choose an appropriate high-end PC server.

NETWORKING

- 45** A new service from AT&T gives high-speed users more management control and will eventually allow them to bypass operators.

MANAGER'S JOURNAL

- 51** Spencer Gifts designs an integrated database to keep buyers and managers apprised of sales trends.

COMPUTER INDUSTRY

- 77** Founders of Brownstone fulfilled their big dream with a DB2-based dictionary geared toward Fortune 500 companies.

EXECUTIVE REPORT

- 61** Rethinking the composition and management of information systems staffs.

IN DEPTH

- 69** Preparing for AD/Cycle. By Samuel Holcman.

DEPARTMENTS

- 8, 99** News Shorts
- 22** Advanced Technology
- 24** Editorial
- 54** Calendar
- 84** Computer Careers
- 92** Marketplace
- 96** Training
- 98** Stocks
- 102** Trends

EXECUTIVE BRIEFING

■ **Telecommuting is about to get a boost from the Bush administration.** The White House has prepared an upbeat endorsement of flexible work arrangements to be delivered by Bush sometime in the next few months. As many as 2,000 federal workers are already using telecommuting in a pilot program the government praises for saving energy, reducing air pollution and retaining employees. **Page 1.**

■ **Japan's mainframe vendors are becoming much more aggressive in the U.S. and Europe.** While the overall mainframe market is softening, Hitachi and Fujitsu hope to boost their combined worldwide market share by 10%. Fujitsu's chairman says his company's Unix offering is an important market differentiator. Meanwhile, Bull's chairman denies press reports that Japan's NEC will increase its ownership of the struggling French vendor. **Pages 1, 4, 100 and 101.**

■ **Adaptability has become the most sought-after qualification in IS employees.** Tightening budgets, escalating demands and architectural changes all require a high degree of flexibility in IS personnel. **Page 61.**

■ **Stiff federal prison terms for three hackers convicted in the Bellsouth case** are seen as a long-awaited deterrent to serious computer crime. Legal experts say the sentences show a new focus on the intent of hackers, which in this case was serious damage to Bellsouth computers and data. **Page 1.**

■ **Midwest Stock Exchange IS chief Mary Jo Moccia died earlier this month on a business trip.** Moccia, 55, was considered a pioneer in financial automation. **Page 8.**

■ **Life along the Mississippi means disaster recovery precautions for data centers in the region,** predicted to be the target of a major earthquake next week. Firms from Illinois to Arkansas are playing "better safe than sorry" with hot-site backups at the ready. **Page 99.**

■ **A massive data center consolidation project is in the home stretch at First Interstate Bank.** When completed, the project will have reduced 11 data centers to three, with predicted savings of \$40 million per year. **Page 6.**

■ **On-line transaction processing is much more**

than hype — it is a technology that meets business needs in a fast-paced marketplace. **Page 29.**

■ **Too many IS departments are run like a "central Soviet,"** says one consultant who advocates dispersing more power and planning to consumers. **Page 51.**

■ **Outsourcing has generated a slew of buzzwords,** and many of them are obscuring true motivations and side effects. **Page 56.**

■ **Is telecommuting appropriate for IS pros?** The answer depends largely on the attitudes of firms and managers. **Page 84.**

■ **IS veterans face harsh reality as their profession calls for more business know-how.** The choice is cut-and-dried: Retrain or be replaced. **Page 96.**

■ **On-site this week:** Ethernet is creating happy LANdings at Canadian Airlines International in Vancouver, B.C., and Toronto, where pilots and mechanics train in local-area network-based facilities that cut simulation costs. **Page 45.** The new baby at Gerber in Fremont, Mich., is an IBM AS/400, but the IS staff has found the System/36 replacement to be a mixed blessing. **Page 33.** Remote computing takes on a new meaning on the floor of the Pacific Ocean, where marine biology researchers took a customized Compaq laptop underwater to study the behavior of stingrays. **Page 41.**

The 5th Wave



"C'MON BRICKMAN, YOU KNOW AS WELL AS I DO THAT 'NOSE-SCANNING' IS OUR BEST DEFENSE AGAINST UNAUTHORIZED ACCESS TO PERSONAL FILES."

WHEN THE FORTUNE 500 WANT SORTING EFFICIENCY, THEY DON'T WASTE TIME.



THEY CALL SYNCSORT.

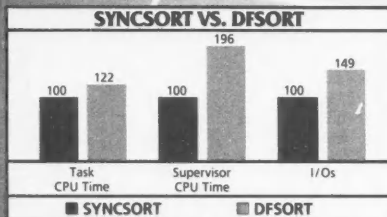
Sorting time can be a costly drain on resources. Which is why most Fortune 500 companies use Syncsort to optimize sorting.

For the most efficient and effective sorting, Syncsort offers a complete solution of software, training courses and performance enhancement services. We act as your partner by evaluating your

unique sorting needs and providing a tailored solution of software and services. Our professional services are unconditionally guaranteed. With Syncsort as your sorting partner, you can double your sorting efficiency.

No wonder most Fortune 500 companies have relied on us for over 20 years. They've seen us consistently outperform the competition, making us the leading sort company. They consider Syncsort to be an investment that pays for itself hundreds of times over.

For sorting efficiency, don't waste time. Call your sorting partner: Syncsort.



syncsort
INC.
50 Tice Boulevard, Woodcliff Lake, NJ 07675
800-535-3355

Bull denies NEC stock rumors

BY NELL MARGOLIS
CW STAFF

Groupe Bull Chairman Francis Lorentz last week unequivocally denied a mid-November European business press report of an increased buy into Bull by NEC Corp.

The troubled state-owned French computer vendor, Lorentz said, is not currently involved in such negotiations. The report said NEC would leverage its 15% stake in Groupe Bull's U.S. subsidiary into a larger, perhaps even controlling, position in the firm [CW, Nov. 19].

The operative word in the Bull disavowal could be "currently," industry observers suggested.

"The sense I've gotten from both Bull and NEC user groups is that the time is not ripe" for an increased NEC/Bull relationship "from a political point of view," said Norman Weizer, a computer industry analyst at Cambridge, Mass.-based management consulting firm Arthur D. Little, Inc.

According to reports in the European press earlier this month, French Industry Minister Roger Faroux, while not yet threatening Bull with loss of its subsidies, has given Lorentz a deadline to come up with a way

to stem the firm's flow of red ink and departing employees.

"I have very strong indications that what the French government wants is a European partner," Weizer said. With few

deal will be signed before the end of the year," said Young Menear, an analyst at the Junior Capital Group in Chicago. "Scrambling in the middle of holiday sales cycle is a very hard thing to do."

Charles White, an analyst at Gartner Group, Inc. in Stamford, Conn., said, "The Japanese style is to go for the long haul — NEC could be waiting for the right time to increase its investment."

The right time, Gartner Group analyst George Lindamood said, is likely to be after the rounds of layoffs and corporate reorganizations that go against the European grain and are currently humiliating Groupe Bull.

However, each of these analysts and a host of others agreed that, at the end of the day, a Bull/NEC deal appears probable.

Few, if any, believe that the beleaguered Bull [CW, Nov. 12] has either the resources or the strategy to go it alone as a major player in the worldwide computer industry.

"The company has always lived off fat state contracts that have shielded it from the harsh realities of the marketplace," Edward O'Hara, president of International Data Corp. Scandinavia, told Norwegian publication *Computerworld Norge*. With

the French public sector newly awakened to the better deals, based on open standards, available elsewhere, O'Hara said Bull is left with one choice if it wants a shot at player status: Submit to a Japanese takeover.

That prescription is getting to be an over-the-counter remedy for ailing European computer firms: Witness Fujitsu Ltd.'s billion-dollar buy of UK-based ICL PLC and Mitsubishi's recent acquisition of Apricot Computers PLC, also in the UK.

"Bull has never fully exploited the technological potential they have in NEC," White noted. Bull's "underutilized partner," he said, "has very powerful communications and semiconductor technology" to contribute as well as the high-end systems that it currently provides to its French connection.

Eventually, Weizer said, "who else but a Japanese company can afford to buy Bull?" Siemens, speculated to be one suit-or of choice, could well be deciding that its recent acquisition of another troubled European computer company — compatriot Nixdorf Computer AG — is enough to occupy its attention and budget. For Bull, Weizer said, NEC might be the only savior in town.

Senior writer Sally Cusack and Computerworld Norge writer Don Radoli contributed to this report.

Hanging on

Bull HN's financial difficulties are further complicated by relatively low market share in the main computer industry segments

Percent of 1989 worldwide market share

Mainframe market share based on factory revenue
5.48% \$30.1 billion*

Midrange market share based on factory revenue
5.18% \$29.4 billion*

PC market share based on end-user revenue
0.9% \$67.9 billion*

* Total market value

Source: Dataquest, Inc. CW Chart: Marie Haines

European firms strategically and financially in a position to make a move on Bull, he said, many industry observers tend to take "European partner" as a euphemism for German giant Siemens AG, long rumored to be contemplating a Bull acquisition.

"I don't think any [Bull/NEC]

ministrator of the U.S. Environmental Protection Agency, said his agency supports telecommuting because cars cause about 40% of the nation's air pollution — even more in large cities.

However, the most tangible federal support came from those who manage the federal government's own work force. Officials at the U.S. General Services Administration (GSA) and the Office of Personnel Management (OPM) said that, while the energy and environmental benefits are nice, the real drivers behind the "flexiplace" program are the government's need to retain and recruit skilled employees and to reduce office rents.

GSA and OPM officials released a set of telecommuting guidelines for federal managers, including the following recommendations:

- The flexible workplace concept includes working at home-based offices and at "satellite facilities," such as a government office closer to the employee's home.
- The most suitable jobs are those that mostly involve information processing, such as program analysts, programmers, personnel specialists, technical writers, claims examiners and clerk/typists. It is not practical for supervisors.

Good candidates for telecom-

muting are those employees with a track record of reliability, time-management skills and high motivation. Telecommuting is an excellent way to attract disabled people to the federal work force. However, studies show that telecommuting and child care are not compatible.

Some of the pitfalls of home-based work can be avoided by using conference calls for important meetings; posting a schedule showing when the telecommuter will be in the office or working at home; and encouraging frequent contact between the office staff and telecommuters via telephone calls, voice mail and electronic mail.

Intergraph gets go-ahead to buy Dazix

BY J. A. SAVAGE
CW STAFF

HUNTSVILLE, Ala. — Intergraph Corp. last week won bankruptcy court approval to proceed with negotiations to purchase Daisy/Cadnetix, Inc. for \$14 million.

Daisy/Cadnetix, known as Dazix, has been under Chapter 11 protection in San Jose, Calif., since May. Daisy Systems Corp., a former high-flying Silicon Valley start-up, produced systems for the computer-aided engineering market. In 1988, it

took on a hostile takeover of Cadnetix Corp., a Colorado-based maker of turnkey systems for printed circuit boards.

Intergraph sells reduced instruction set computing workstations and its own engineering software to four main markets: architectural and civil engineering, geographical information systems mapping, mechanical design and federal systems. It is approaching \$1 billion in revenue for 1990, according to a spokesman, with half of its income from non-U.S. sources.

The original Daisy became a

notable Silicon Valley firm when its revenue raced from \$7 million to \$25 million in 1983. Since the mid-1980s, Mountain View, Calif.-based Daisy has been notable for losses, posting a loss of \$140 million last year as Dazix.

Intergraph's \$14 million bid consists of \$10 million in cash and \$4 million in Intergraph stock, the spokesman said. He said there are no plans yet regarding the 550 Dazix employees if the bid is accepted, but he added, "We're looking to merge the intellectual capabilities and properties of the company."

COMPUTERWORLD

Editor in Chief

Bill Laberis

Executive Editor

Paul Gillin

News Editor

Peter Bartolik

Assistant News Editor

James Connolly

Senior Editors

Clinton Wilder, Management
Elizabeth Horwitz, Networking
Patricia Keefe, PCs & Workstations
Michael Alexander, Advanced Technology
Rosemary Hamilton, Systems & Software
Nell Margolis, Industry
Maryfran Johnson, Systems & Software

Senior Writers

Jonnie M. Weider

Richard Pastore

Staff Writers

Sally Cusack

Carol Hildebrand

New Products Writer

Gary Byrne

Research Coordinator

Kevin Durbin

Features Editors

Glenn Rifkin

Joanne Kelleher

Senior Editors

Michael L. Sullivan-Trainor

Joseph Maglitta

Lory Zetola

Mary Grover Brandel

Donald St. John

Senior Writer

Alan J. Ryan

Associate Editor

Cathleen A. Duffy

Researchers

Jodie Naze

Kim Nash

Intern

Derek Slater

Chief Copy Editor

Joyce Chutchan

Assistant Chief Copy Editor

Catherine Gagnon

Features Copy Editor

Kimberlee A. Smith

Copy Editors

Christopher Lindquist

Alice Lesch Kelly

Kelly E. Dwyer

Steven J. Condon

Design Director

Nancy Koval

Graphics Designer

Tom Monahan

Graphics Specialist

Paul Mock

Design Assistant

Marie J. Haines

Assistant to the Editor in Chief

Linda Gorgone

Editorial Assistants

Lorraine Witzell

Stefanie McCann

Connie Brown

Rights and Permissions Manager

Sharon Bryant

Back Issues

Margaret McIndoe

News Bureaus

Mid-Atlantic

201/967-1350

Johanna Ambrosio, Senior Correspondent

Washington, D.C.

Mitch Betts, National Correspondent

202/347-6718

Gary H. Anthes, Senior Correspondent

202/347-0134

West Coast

415/347-0555

Jean Borzman, Senior West Coast Editor

J.A. Savage, Senior Correspondent

James Daly, Senior Correspondent

Jim Nash, Correspondent

Maura J. Harrington, Correspondent

Marilyn Scott, Editorial Assistant

Midwest

708/827-4433

Ellie Booker, Bureau Chief

Michael Fitzgerald, Correspondent

IDG News Service

Penny Winn, Director

Main Editorial Office

Box 9171, 375 Cochituate Road

Framingham, MA 01701-9171

508/879-0700

Fax: 508/875-8931

MCI Mail: COMPUTERWORLD

Subscriptions: 800/669-1002

If DB2 Is The Answer, What The Heck Was The Question?

Beginning to wonder about betting your company's future on DB2?

Wouldn't you like to know how IBM's information management approach will address the major problems and issues you'll face in the 90s?

We think you would. So, we've developed a check-list of what's most important to you.

So you can clearly see what you can expect from IBM.

And what you can expect from us.

		IBM	CA
INVESTMENT PROTECTION: Runs applications without change from...	DL/I		✓
	IMS		✓
	VSAM		✓
	TOTAL		✓
	CA-IDMS		✓
	CA-DATACOM		✓
PORTABILITY Runs identically on...	MVS		✓
	MVS/XA	✓	✓
	MVS/ESA	✓	✓
	VSE		✓
	VM		✓
	PC-DOS		✓
	PC LAN		✓
STANDARDS	ANSI SQL	✓	✓
	FIPS	✓	✓
	SAA	✓	✓
	NAS		✓
DISTRIBUTED DATABASE	Remote Request	✓	✓
	Distributed Request		✓
	Replication		✓
	Partitioning		✓
INTEGRATION	Dictionary		✓
	w/Systems Security		✓
PROVEN: Supports tens of thousands of mission-critical applications			✓

As the world's leading independent software company, Computer Associates can give you more.

Much more.

To begin with CA-IDMS®/DB and CA-DATACOM/DB® are more practical, productive and proven than DB2. Offering you a clearly superior alternative.

Our comprehensive software

engineering solutions and integrated life-cycle support are ready today including: 4GL's; one of the industry's most successful COBOL

development environments; application generators; knowledge-based systems and products for project estimation and change management.

In addition, our information management solution is built upon the Computing Architecture For The 90s which can free you from hardware constraints. All of your mission-critical

applications can run on multiple platforms and operating systems from mainframe to midrange to PC.

CA90s also protects the massive investment you've made in your existing applications with transparency software that allows you to run your present applications unchanged using our relational database technology.

Altogether, it's a smarter, more practical approach to information management.

And one that's readily available today.

Which leaves just one question for everyone who's still patiently waiting for IBM...

What are you waiting for?



COMPUTER ASSOCIATES
Software superior by design.

Intel readying downscale 486

Company working toward creating affordable multiple-level 486 chips

BY MAURA J. HARRINGTON
CW STAFF

SANTA CLARA, Calif. — Intel Corp. confirmed last week that it is working to expand its i486 microprocessor product line downward next year. Analysts said the company is intent on keeping upcoming 80386 chip makers at arm's length from being serious competitors.

Although a 50-MHz version of the 486 chip has been widely discussed, Thomas Macdonald, Intel's marketing manager for the 386 and 486 product lines, said Intel will introduce new versions of the 486 chip on both a higher and lower level than what is being marketed today.

"We are going to push prices down in a way to make it more affordable to the user to put a 486 on their desktop," Macdonald said, adding that Intel will offer solutions on the 486 level similar to those available today on the 386 level.

In the face of anticipated 386 clone chips from Advanced Micro Devices, Inc. and others, analysts predicted last week that Intel may be developing alternative 486-level chips to move users toward higher-end products, as it did with its 386SX campaign a little over a year ago.

Price comparable to 386

Although Macdonald declined to map out any more specifics on the product expansion plan, semiconductor analyst Michael Slater, editor and publisher of "The Microprocessor Report," a periodical published out of Sebastopol, Calif., said, "Intel will probably make a 486 chip with no floating-point processor" at a price competitive with that of its 386 chip.

In October 1989, Intel began a nationwide, multimillion dollar campaign to introduce its 386SX microprocessor — a hybrid 16- or 32-bit chip at the price of a 16-bit or 286 chip. The campaign, marked by advertisements with a large red "X" painted over the 286 numbers, caused 286-based

Dean McCarron, an analyst at In-Stat, Inc., a market research firm based in Scottsdale, Ariz.

"There is definitely a demand for a less expensive 486 alternative... and I'm sure that if Intel were to develop one, users would jump to buy it," McCarron said. "I see this as a tactical

Sales tally

Sales of systems based on Intel's i486 have barely begun to take off in comparison to the 80386 and 386SX, according to a survey of computer stores

	Unit sales			
	1989	1990	1989	1990
	Q4	Q1	Q4	Q1
i486	—	498	2,355	3,702
80386	159,804	136,675	153,418	146,707
386SX	133,694	121,798	161,335	197,201

Source: Stoneland, Inc.

CW Chart: Paul Mock

computer sales to plummet, industry analysts said.

The campaign had an impact on the way users purchased computers, as well as on the decrease of 286-based computer sales, said JoAnn Stahl, president of Dallas-based market research firm Storeboard, Inc.

However, Macdonald said last week, Intel's incentive in introducing multiple-level 486 chips is not to drive out its highest selling microprocessor.

"The 486 will not outstrip the 386 next year by any means, and there certainly won't be a campaign to wipe out the 386 chip," Macdonald said.

Nevertheless, in order to push users into spending the money on an even higher-level product, the price of 486-based computers still has to drop. This means the price of the CPUs must also drop, according to

move for Intel as well," he added.

Joe Brooks, manager of computer operations at the Pacific Stock Exchange in San Francisco, said the price of 486-based computers would have to come down close to the level of 386 personal computers before he would consider upgrading in the near future.

"Currently, we have 386-based PCs installed here, and we have no plans to upgrade to 486 at this time, but we would look at an alternative if it were [a 486-level computer at a 386 price]," Brooks said.

So far, Intel is the only company with the rights or technology to market a 386 microprocessor, but analysts claimed that the situation will probably change over the next few months, loosening Intel's monopoly.

Hitachi 'tunes' low-end EX models

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — Hitachi Data Systems Corp. repositioned its low-end EX mainframes last week to more closely correspond to IBM's Enterprise System/9000 air-cooled mainframes, which were announced Sept. 5.

HDS changed the computer cycle times to "tune" the existing low-end EX Models 10 through 38, creating a new set of six machines, including four uniprocessors and two dyadic processors. Cycle times on the EX machines were reduced from 20 to 17 nsec, HDS sources said.

"Our enhancements happen to result in a better alignment to IBM's airframe machines," said

Chris Worrall, director of intermediate systems marketing. The HDS models were changed only slightly, with performance

OUR ENHANCEMENTS happen to result in a better alignment to IBM's airframe machines."

CHRIS WORRALL
HITACHI

of the EX 11 now just 1.09 times that of the older EX 10; the high-end EX 42 is 1.24 times that of the older EX 38.

HDS is targeting the estimat-

ed 30,000 IBM 4300-class sites worldwide, providing the only counterpoint to the air-cooled portion of the IBM ES/9000 family.

"HDS realizes that IBM salespeople are doing a lot of market development for them by talking up the air-cooled ES/9000s," said Peter Burris, director of the IBM Advisory Service at International Data Corp. in Framingham, Mass. "HDS is really the only other game in town, because Amdahl Corp. does not ship equivalents to the low-end ES/9000 computers."

Based on a combination of emitter-coupled logic and CMOS chips, all the HDS machines can be outfitted with a main memory of 512M bytes — twice the standard 256M bytes shipped with

First Interstate nears end of consolidation

BY PATRICIA KEEFE
CW STAFF

HOUSTON — When 80 information systems employees close the doors for good on a First Interstate Bank data center here late next year, the action will also close the books on a three-year effort by the bank's parent to consolidate 11 regional data centers and one backup site.

In addition, the banking group will shutter a warm backup site in California.

So far, the Los Angeles-based parent, First Interstate Bancorp/California, has closed seven data centers, averaging a savings of about \$40 million dollars per year, said Hayden Watson, group manager of the Operations Group at First Interstate in Houston and a member of a corporatewide task force on standardization. "It's a staggering annuity, mostly from eliminating redundancy," he said.

Concurrent with the 1991 merger of the Houston-based data center into three other data centers in Arizona, Oregon and California, First Interstate will undertake a series of application conversions as part of a companywide effort to move all 22 affiliate banks to a consistent platform.

Because of the conversions, some affiliates may endure future cutbacks in IS personnel as older applications are jettisoned and replaced with standards, a bank source said.

"When we talk about consolidating, we're not just relocating existing equipment. We're talking about 10 to 12 systems conversions going on simultaneously over the next year," Watson said.

For example, the banking group's policy committee for operations and information services has settled on one consumer loan and one general ledger application standard. The committee is made up of data processing and other senior-level executives.

the low-end IBM ES/9000 machines, Worrall said.

The revamped EX line includes enhancements in the areas of memory management, capacity and peripherals attachment. The machines support up to eight optical channels; previous low-end EX models supported only four direct-attached optical channels.

The new EX models also support logical partitioning of main memory into real memory and expanded memory or a combination of both. Pricing on the low-end EX models is designed to be

To pull off the conversions, it is important that First Interstate retain its IS staff until the end of 1991. Watson said the bank hopes to do this via a combination of a generous severance package and a "retention-type bonus." A minimum of 60 days' notice is guaranteed to any affected employee. To ensure that most stay, the size of the severance package is reportedly tied to the length of time the employee remains with the company. So far, only three employees have resigned.

On Aug. 15, First Interstate's 119 Houston-based IS employ-

WE ARE CONFIDENT WE will not see a reduction of service or responsiveness."

HAYDEN WATSON
FIRST INTERSTATE

ees were summoned to a luncheon, where they were told about the consolidation plans. Of the 80 affected employees, some will be moved elsewhere within the firm, either locally or to another affiliate.

"No one will be affected before June 1991, and [any layoffs will happen] by December 1991," Watson said.

First Interstate has also taken pains to ensure that the impact from the conversions on customers and user departments is minimal. Committees have been set up to involve end users in the conversion and future upgrade processes.

Watson conceded that users may not be able to do things in quite the same way as they did with a local data center. "It's clear that the process [of working with IS] will need to be more structured, but we are confident we will not see a reduction of service or responsiveness."

about 95% of IBM's list price, Worrall said.

HDS will continue to sell the EX Model 33, a uniprocessor, and Model 44, a dyadic processor.

The new EX models are scheduled for shipment to customers in January; upgrades from installed EX models will be available in second-quarter 1991. Prices range from \$315,000 for an EX 11 with 32M bytes of storage and eight channels to \$2.6 million for an EX 44 with 512M bytes of storage and 32 channels.

The Problem With Buying Software From A Hardware Company

Once a company gets locked into hardware and software from one computer vendor, it operates at the mercy of that vendor.

Many companies buy and build software that runs on only one kind of computer. Locking themselves into one vendor's hardware.

These companies can then find themselves trapped

into buying a ten million dollar computer when a one million dollar computer from another vendor would actually do a better job.

These expensive hardware traps can easily be avoided by using the right software.

Oracle software runs on virtually every computer—mainframes, mini-computers, workstations and PCs. From virtually every vendor.

Oracle software lets companies develop applications that run on all their computers. And share data among them as well.

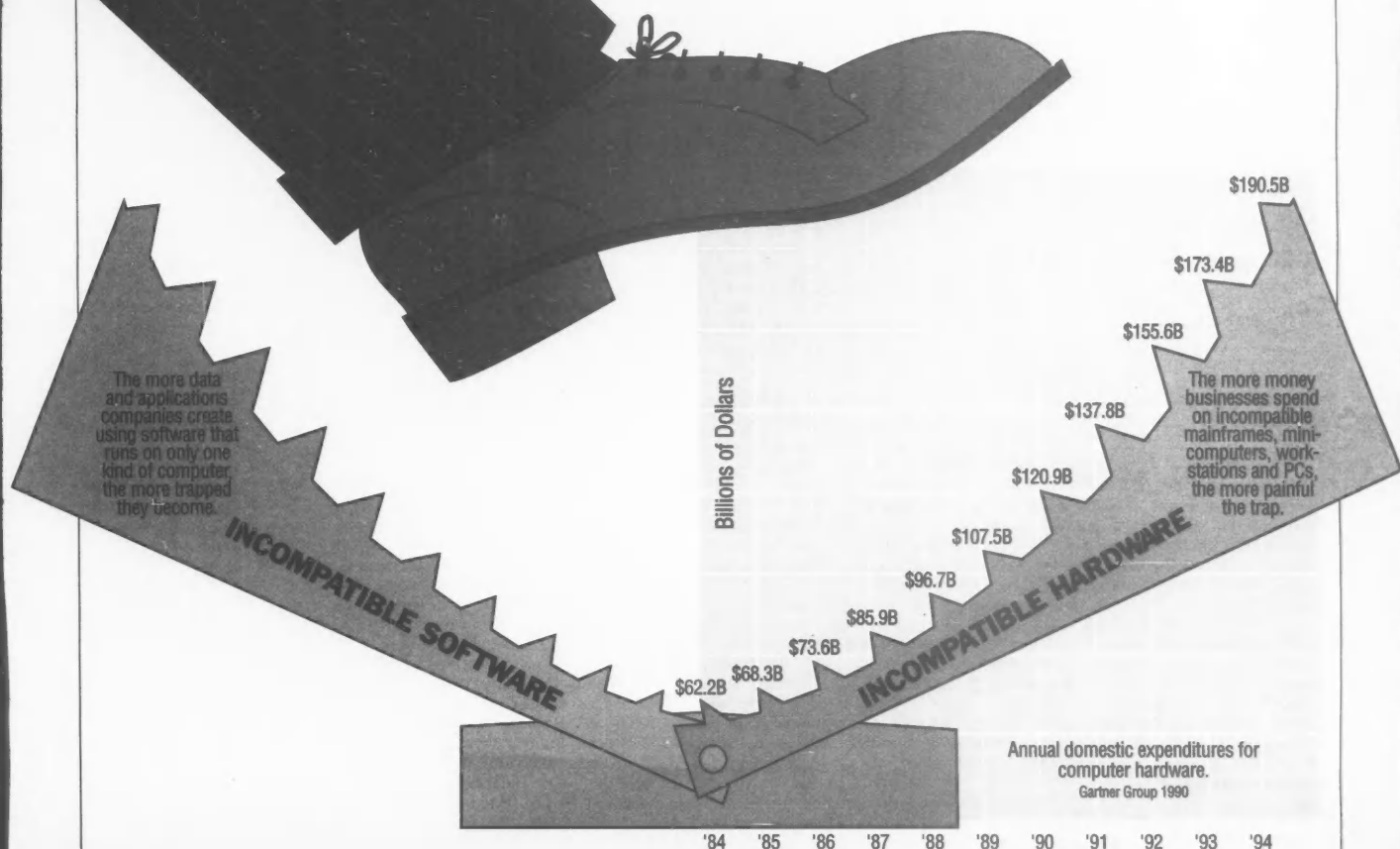
Most important of all, it lets companies exploit newer, faster and cheaper technologies as they emerge.

Call 1-800-633-1071 Ext.8112 for more information.

We'll tell you how you can move forward without worrying about what you're stepping into.

ORACLE

Software that runs on all your computers.



NEWS SHORTS

Software sales boom

The Software Publishers Association (SPA) took time out from its international piracy watch last week to spread tidings of comfort and joy: A 34.4% surge in third-quarter 1990 North American retail software sales logged in at an estimated \$1.15 billion. Data submitted by 150 U.S.-based software companies showed sales of Microsoft Corp. Windows-based applications up 213%; Apple Computer, Inc. Macintosh-based publishing software increased 91%; and MS-DOS/Windows graphics software sales increased 85%, higher than sales posted in last year's corresponding quarter, according to the SPA.

Aetna reorganization takes shape

Aetna Life and Casualty Co.'s Oct. 26 announcement of a major corporate reorganization will result in the elimination of about 2,600 jobs, according to the company. John Hawkins, a spokesman at the insurance firm, said there were some areas of redundancy in the information systems area and that "it's honest to say that there will be some positions in DP affected," although he was unable to give specific numbers. "It's clear that the majority of them will be job terminations as opposed to attrition," Hawkins said. He added that most of the cutbacks will be at the firm's three Hartford, Conn., area locations, which is where most of Aetna's IS capabilities lie.

Northern Telecom upgrade in place

Southern Bell Telephone & Telegraph Co. last week became the first regional operating company to install Northern Telecom, Inc.'s Enhanced Network, a central office switch add-on that is said to provide an inexpensive upgrade path for carriers with burgeoning customer bandwidth demands. The product, which Southern Bell has installed at its Atlanta-based central office, enables a previously installed Northern DMS digital switch to support as many as 128,000 simultaneous 64K bit/sec. connections, while reducing the extra engineering, provisioning and managing costs typically associated with such an upgrade, Northern said. Later versions will also support fiber-based broadband services.

IBM forms partnership

IBM last week announced a deal with Check Consultants, Inc., a subsidiary of First Tennessee National Corp., to form a partnership to sell image application software and services to the financial services industry. The joint venture, which is subject to regulatory approval, will be called Check Solutions Co.

DEC recasts banking packages

Digital Equipment Corp. repositioned its software and services products for banks in the consumer market as an integrated family last week. Called Decbank, the family encompasses existing DEC hardware and communications products and adds a layer of integration software and a customizable user interface. The integration layer allows banks to plug in their existing applications and bank-specific devices.

Boxing gloves at FDDI meeting?

Though the Fiber Distributed Data Interface (FDDI) local-area network standard was approved and forwarded by the American National Standards Institute FDDI committee last spring, committee members will reportedly duke out a network management tweak to the standard at next week's meeting in San Jose, Calif. Parameter Management Frames are currently an optional component to the Station Management portion of the standard. One segment of the vendor community advocates that the frames be mandatory to ensure network management of all stations in a heterogeneous FDDI network at the lower two layers of the Open Systems Interconnect (OSI) model. Opponents to the mandate, including DEC, generally advocate parameter management functions taking place at the upper layers of the OSI stack, both for security reasons and because of redundancy in FDDI implementations already handling network management.

More news shorts on page 99

Moccia succumbs to heart attack

BY CARL MALAMUD
SPECIAL TO CW

Mary Jo Moccia, senior vice president of the Midwest Stock Exchange and an internationally renowned pioneer in automating financial systems, died of a heart attack on Nov. 16 at age 55.

A versatile executive with wide-ranging interests, Moccia had received much of the credit for the recent performance of the Midwest Stock Exchange, with volume second only to the combined American/New York Stock Exchange.

Moccia was able to convince senior management of the exchange of the benefits of automation. She built a team of pro-

grammers and led the implementation of the system.

Moccia then turned her attention to the automation of stock exchanges throughout the world, including the stock exchanges in Amsterdam and Thailand, where she was visiting in connection with the automation of a trading system at the time of her death.

In a recent interview, she said she viewed stock exchange automation as vital if exchanges were to survive in an increasingly global marketplace.

Moccia's ability to work with senior management and a highly technical staff made her a remarkable person.

"Mary Jo Moccia was the architect and the driving force behind our automated systems,"

said Charles Doherty, president of the Midwest Stock Exchange. "She demanded excellence, was extremely talented, yet was always willing to give credit to the people that worked with her."

Malamud is a free-lance writer in San Francisco.



Moccia was financial systems pioneer

Bush vetoes export bill but seeks loosened restrictions

BY GARY H. ANTHERS
CW STAFF

WASHINGTON, D.C. — After vetoing a bill that would have eased restrictions on the export of advanced computers and telecommunications equipment, President Bush ordered federal agencies to streamline and relax regulations governing the export of such items to U.S. allies.

The president vetoed the bill, which would have reauthorized an export law that had expired Sept. 30, on Nov. 16. He said provisions mandating sanctions against countries using chemical and biological weapons would "severely constrain presidential authority in carrying out foreign policy."

Instead, Bush issued an executive order that mandates tighter controls on exports that might be used to produce these weapons and sanctions against countries that do so.

"The president actually listened to some of our concerns and addressed some of our top priorities," said Debra Waggoner, a trade specialist at the American Electronics Association, referring to a Bush memorandum outlining administration plans to ease computer export controls.

The vetoed bill would have required the government to automatically update the performance-level thresholds allowed for export of computers. The cutoff for the strictest controls would have been set at not lower than 25% of the processing speed of the fastest two commercially available systems.

It also would have provided for largely license-free exports to the 16 Coordinating Committee for Multilateral Export Controls (Cocom) countries.

The Bush memo that accompanied the veto directed the government to do the following:

- Remove many items having both commercial and military uses from licensing requirements for export to Cocom countries. It is a step toward the Cocom "license-free zone" urged by industry.

- Shorten the times required to get various export licenses.

- By June 1, in consultation with industry, devise a way to index supercomputer export license restrictions to allow for rapidly changing technology.

- Ensure that supercomputer controls are multilateral so that domestic suppliers are not at a competitive disadvantage.

- Increase the performance thresholds, and update them more often for items that qualify for low-level, mass-distribution licenses.

Anne Urban, director of international policy issues at the Computer and Business Equipment Manufacturers' Association (CBEMA), said she was disappointed the president had vetoed the legislation, which CBEMA had backed. "But we're a little surprised the president is doing something. The legislation caught his attention."

DEC's Phoenix shutdown spells layoffs

BY SALLY CUSACK
CW STAFF

MAYNARD, Mass. — In what may evolve into the company's first official layoff ever, Digital Equipment Corp. announced last week that it will close a plant in Phoenix that employed 460 people.

"We haven't ruled out the possibility of additional plant shutdowns, nor have we ruled out the possibility of layoffs in the future," said Jeffrey Gibson, a spokesman for DEC. He added that only the Phoenix facility itself will be shut down and that all employees at the plant are still officially on the DEC payroll.

This may be a year of firsts for DEC. The company posted its first-ever quarterly losses earlier this year and, according to analysts, must consider across-the-board downsizing to ensure a return to black ink in the future. DEC President Kenneth H. Olsen has stated repeatedly in the past that the computer company hopes to avoid layoffs.

"Clearly, if one looks at the total head count at DEC vs. the total volume they do, some adjustments have to be made," said John W. Adams, chairman at Adams, Harkness & Hill, a Boston-based financial consulting firm. "DEC will either have to raise the bridge or lower the water."

According to David Wu, financial analyst at S. G. Warburg & Co. in New York, the company has a structural cost problem that a "little Band-aid won't cure."

He added that traditional engineering companies such as DEC tend to react slower to this type of cost-cutting and change.

The Phoenix plant provided multiple services for the company, including manufacturing, systems integration, property disposal and distribution.

DEC has not announced a timetable for closing the facility so far. The company currently employs 123,500 people worldwide.

Closing Arguments

Only ORACLE supports virtually every vendor's software, hardware and network.

Today, some software companies claim that their software products are "open." They may even graft the word onto their product names. It is a confusing situation, but a clear definition of "open" is finally emerging.

Software is "open" only if it adheres to industry standards and works with products from other vendors.

SO OPEN OPEN OPEN OPEN STANDARDS
OPENVIEW OPEN SYSTEMS
OPEN ARCHITECTURE
VERY OPEN MOST OPEN

More specifically, a database is open if it works with other vendors' databases. For example, ORACLE provides access to IBM's DB2, SQL/DS and DEC's RMS.

An open database should also work with other vendors' applications. ORACLE works with DEC's All-in-1, DG's CEO, IBI's Focus and SAS. And it supports PC and Mac software like Lotus 1-2-3, WordPerfect, Borland's Paradox and Apple's Hypercard. Even Dbase applications run on ORACLE.

Software is open if it runs on every vendor's operating system. ORACLE runs on MS-DOS, OS/2, Mac OS, UNIX, VMS, MVS and virtually every other operating system on the market.

And software is open if it supports every vendor's network. ORACLE supports IBM's LU6.2, LAN Manager, NetBIOS, DECnet, Novell's SPX/IPX, industry standard X.25 and TCP/IP and many others.

Choosing open software today lets users choose any vendor's hardware, software and network tomorrow.

Call 1-800-ORACLE1 ext. 8197 to sign up for an Oracle Database Conference near you. And keep your software and your options open.

Call
1-800-ORACLE1
Ext. 8197
to sign up for the
Database Conference
in your area.

ORACLE®

Compatibility • Portability • Connectivity

Cadre to boost CASE suite

BY ROSEMARY HAMILTON
CW STAFF

PROVIDENCE, R.I. — Cadre Technologies, Inc. plans to roll out an expanded set of computer-aided software engineering (CASE) tools for the technical market today.

Teamwork/4.0 will include a reverse-engineering tool for the C programming language as well as an additional design tool for the Ada programming language. The company also expanded its object-oriented analysis support for the C++ language.

The company plans to begin shipping a version designed for Hewlett-Packard Co. Domain workstations in first-quarter 1991. It will follow in the second quarter with versions for other Unix platforms, including Sun Microsystems, Inc., Digital Equipment Corp. Ultrix and IBM AIX, according to Yvonne Cekel, director of product marketing.

The Cadre CASE tool set, first released in 1986, is targeted at technical users running Unix platforms and is typically used for C and Ada development.

Last year, the company released a front-end analysis tool for object-oriented

programming (OOP) that focuses on C++. It does not yet provide a full suite of tools for OOP. With Teamwork/4.0, the analysis tool will include new features such as proper syntax search capabilities.

Software redesign tool

The reverse-engineering tool for C, called Teamwork/C Rev, will allow users to build structure charts automatically from C source files, which can be used in redesigning the software.

Teamwork/DSE is a design-sensitive editor for Ada that allows users to keep code consistent with the design representation of a program. The editor enforces the design principles on the code, which helps eliminate errors that can occur when design concepts are translated into

actual code.

Cadre will offer both the reverse-engineering tool and Ada design-sensitive editor as separate add-on components to Teamwork. The additional OOP analysis tool features will be rolled into the base price of the tool set, which starts at \$7,500 per seat.

Pricing for Teamwork/C Rev starts at \$8,000 per seat, and Teamwork/DSE can be licensed for fees starting at \$2,775.

Consolidation in PC stores

BY RICHARD PASTORE
CW STAFF

Compucom Systems, Inc.'s offer to buy The Computer Factory, Inc. earlier this month is one high-profile example of a coming dealer consolidation that threatens even giants such as Businessland, Inc.

"I definitely think there's a consolidation here," said Charles Wolf, an analyst at First Boston Corp. in New York.

Plunging profits, an oversaturated dealer market and even slower personal computer sales next year will perpetuate a shakeout and consolidation in 1991, analysts predicted.

For users, a shakeout would lead to fewer choices but may not necessarily mean an end to cutthroat pricing, analysts said. "As long as there are two dealers in a town, there's going to be price wars," one Computerland, Inc. dealer said.

The latest example of consolidation has PC distributor Compucom offering \$39 million for Computer Factory's 63 retail outlets. The offer, which awaits stockholder and regulatory approval in January, seems to have discouraged hostile bidder Bay Street Group. This San Francisco banking concern had earlier offered \$34 million for the chain.

Computer Factory has been hurting ever since it set up an expensive corporate outbound sales force and pushed its territory beyond its Northeast base, observers said. The firm is expected to lose \$13 million this year.

Businessland has also been losing millions, posting four consecutive quarterly losses. In announcing the latest \$19.9 million shortfall, Chief Executive Officer Dave Norman said no offers have been made to buy the company.

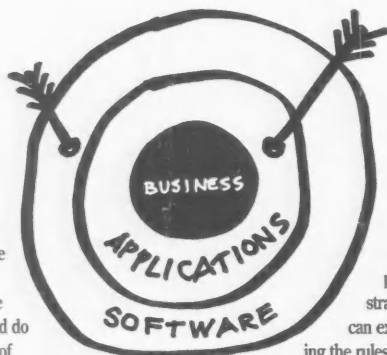
"We have a shareholder-rights program in place and a strong relationship with our vendors," Norman said. "I don't think it would make much sense to come in" with a hostile takeover attempt.

Observers were not so sure. Though Businessland's corporate structure would have to be downsized and reshaped to be profitable in today's market, its name recognition could be a valuable asset, analysts said.

The Computer Factory purchase makes more immediate sense, according to Wolf. "Geographically, this looks like a good fit for Compucom," he said. Computer Factory has already begun changing its selling profile to that of a mass-merchandising "superstore," something Compucom will likely continue, Wolf added.

"As a commodity item, the PC lends itself toward a mass-merchandizing type of approach," Wolf said.

As long as the aim of CASE vendors is better software, they'll be off-target.



The aim of CASE should be better business.

"Self-evident," you say? Well, not from what you see and hear in the CASE marketplace.

At BACHMAN, we have some unique ideas about what CASE should do for the enterprise. And unique ways of helping you hit what you're aiming for.

Help business people understand technicians
Help technicians understand business

Companies realize their full strategic potential when business can talk to MIS and vice versa. For the first time, with the new BACHMAN/Analyst™, an entire enterprise can speak a common language—rich enough for non-technicians to understand, precise enough to create software that works well.

Companies can build reliable systems quickly, and go about the business of doing business competitively.

Create a complete business model—
Always responsive to change

Staying competitive means first, staying ahead of the changes imposed by the real world of business, and second, having the means to exploit advances in information technology. In both cases, BACHMAN offers a unique advantage.

BACHMAN products decouple business needs from the

technical details of implementation when specifying and designing systems. Companies can respond to changes in business requirements independent of the opportunities or constraints presented by the technology. They can exploit technical innovations without altering the rules that define the business. The result? Synergy, not conflict.

Generate production-quality systems—
Systems that remain current

A BACHMAN business model is readily translatable to high performance systems. Surely a boon to new systems development. And the BACHMAN business advantage only begins with new development.

The recognized capabilities of the entire BACHMAN/Re-Engineering Product Set® mean that business models are kept current, technology designs are easily optimized, and application systems are readily maintained and enhanced. Sound good?

There's a great deal more

We've only begun to zero in here on the competitive advantage BACHMAN represents to your organization. Information about seminars, and substantial

1-800-BACHMAN

proof of what we say, is available. Please call to find out the ways in which our aim is true.

BACHMAN

For more than software. For business.

8 New England Executive Park / Burlington, MA 01803 / Phone: (617) 273-9003 Fax: (617) 229-9904

© 1990 Copyright, Business Information Systems, Inc. All Rights Reserved. BACHMAN/Analyst is a trademark and BACHMAN/Re-Engineering Product Set is a registered trademark of Business Information Systems, Inc.



Running In More Powerful Circles

ORACLE for IBM lets your mainframes share data with all your computers. Not just other mainframes.

It seems every other consultant, editor and PC user is gleefully proclaiming the death of mainframe computing. And with it, the end of MIS's influence.

Guess again. According to a 1990 user survey,* 64% of all new applications developed in '90 and '91 will be on mainframes. And what's more, Computer Intelligence says that 79% of mainframe sites also have minis, PCs and workstations.

The challenge then, is to find a way to integrate those valuable mainframes with all the other computers in the company.

Oracle databases, tools and applications

run unchanged on virtually every mainframe, mini, PC and workstation. From MVS and VM mainframes to DEC VAXes. From RS/6000 UNIX workstations to OS/2 and MS-DOS PCs. Even the Macintosh.

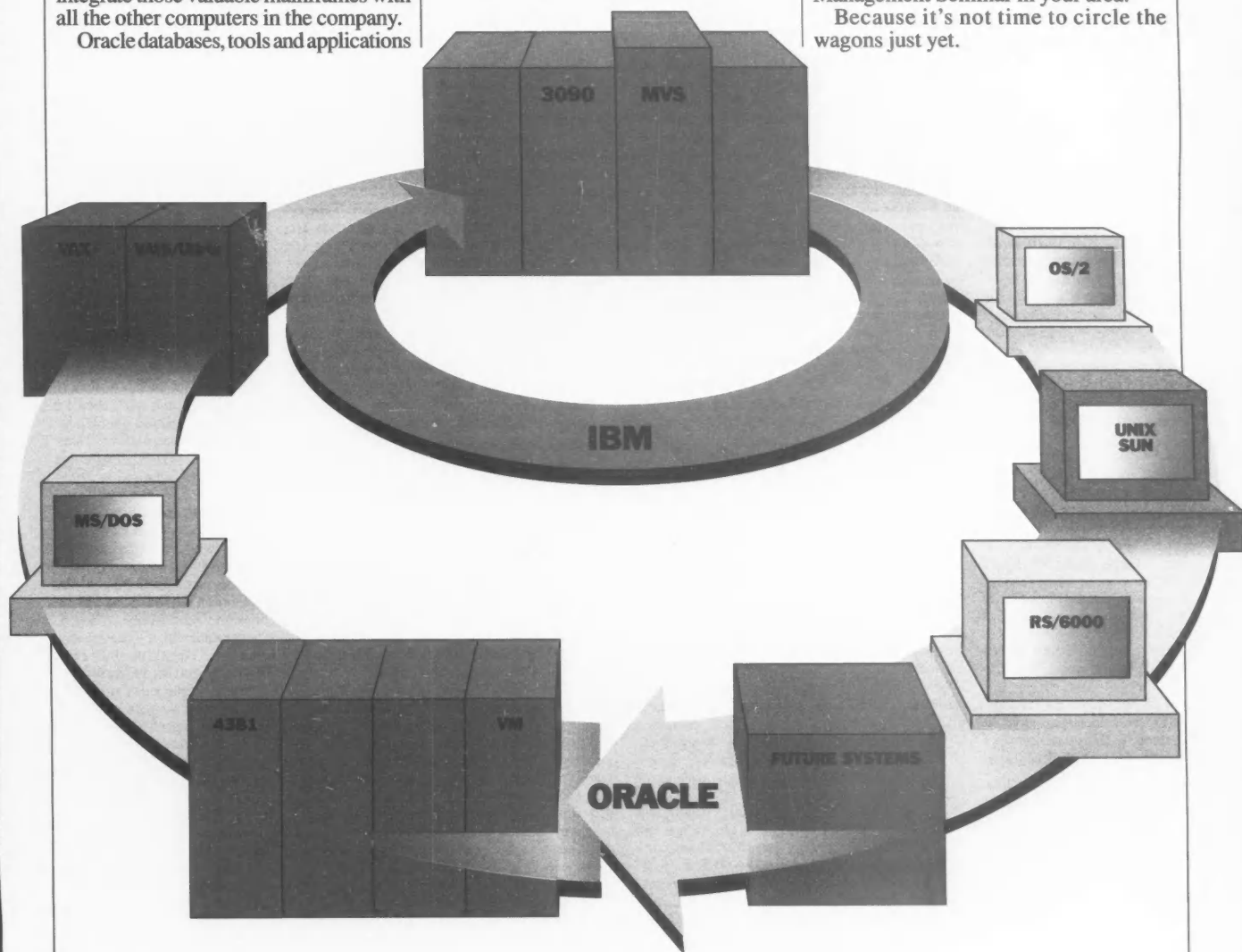
But more than just running on these computers, Oracle software integrates them into a cooperative computing and information sharing network. So businesses can protect their mainframe

investment, while freely introducing alternate technologies.

Oracle provides the reassurance of being the largest database company in the world. In fact, over half of the 8,000 Oracle employees are devoted to customer service.

If you're interested in widening your circle of influence, call 1-800-633-1073 ext. 8117 for more information. Or to sign up for the free ORACLE for IBM Management Seminar in your area.

Because it's not time to circle the wagons just yet.



ORACLE®

Compatibility • Portability • Connectability

*1990, Datamation/Cowen & Co. user survey.

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

User confident Timeplex will stand tall

BY JOANIE M. WEXLER
CW STAFF

PADUCAH, Ky. — A 25-year Unisys Corp. customer is confident that Timeplex, Inc. can stand on its own two feet as its primary communications vendor — despite Wall Street's speculation that the financially ailing Unisys might sell its Woodcliff Lake, N.J.-based subsidiary.

Computer Services, Inc. (CSI), an independent data processing company serving 170 customer banks, has just brought up a \$300,000 T1 backbone network comprising Timeplex Link/2+ System and Microlink System T1 multiplexers. The network, which integrates voice and data, snakes among nine CSI data centers strung through six Midwestern and

Southern states.

CSI stores and manages data for customer banks, which are on-line with Unisys hosts in the CSI data centers 24 hours per day. CSI's decision to install Timeplex equipment one year ago was made independently of the Unisys/Timeplex relationship, according to R. Lee Hagan, CSI's vice president of telecommunications.

While he conceded that the vendors' relationship was in a neophyte stage at that time, Hagan said Unisys' subsequent financial woes are not posing any new concerns for him about Timeplex.

"Timeplex is a strong company in its own right, and its strength is not based on its association with Unisys," he commented. He added, though, that

having Unisys engineering support on-site has turned out to be "icing on the cake."

What CSI considers icing might seem more like batter to other existing Unisys customers who are considering Timeplex equipment, particularly if something were to happen to the Unisys/Timeplex umbilical cord.

"If I were already a Unisys customer and was investing in the Unisys/Timeplex package, I'd be worried about synergy problems with service and support," commented Rick Villars, manager of computer networking architecture at International Data Corp.,

a market research firm in Framingham, Mass. "If I were not an existing customer, though, I'd simply judge Timeplex's financial stability on its own merits."

The impetus behind the new CSI network is to accommodate burgeoning growth in electronic activity in client banks and to reduce long-distance voice charges "by about 75%," according to Hagan.

Hagan said he expects a payback on his T1 equipment investment in about 3½ years. The savings will come "primarily in trunk charges and new installations at the banks," he explained.

He said that a major factor prompting CSI to revisit its networking strategy was that



CSI's Hagan enjoys Unisys support

Internet

FROM PAGE 1

sorted out. A commercialized network must face issues of fiscal accountability, access rights, type of use and whether it should be regulated as a monopoly, noted a "request for comments" issued on the network this month by a working group of the Internet Activities Board.

Some said a commercialized Internet will grow in scope to rival the voice telephone network, providing all sorts of commercial services, including entertainment — perhaps replacing cable television — transaction processing and information services.

A commercialized Internet could become a national information infrastructure, "a ubiquitous, orderly communications system that reflects and addresses all social needs and market demand without being subject to artificial limitation on purpose or connection," said Brian Kahin, director of the Information Infrastructure Project in the Science, Technology and Public Policy Program at Harvard University in Cambridge, Mass.

What will make commercialization possible is the looming turnover by the government of network control and direct funding in the private sector.

Federal support

While federal funding has been a small fraction of the total cost of building and maintaining Internet, the government's control has been considerable since the federal agencies that manage the Internet backbones have traditionally barred most commercial traffic (see story this page).

Internet was built on networks sponsored in the early 1980s by government agencies such as the U.S. Department of Defense and the NSF for use by a

relatively small number of people involved in government-sponsored research.

However, use has skyrocketed with the availability of personal computers and the sophistication and interoperability of communications gear.

A proposal sponsoring the National Research and Education Network (NREN), the so-called "gigabit net" that is likely to replace much of what is now Internet, stipulates that direct federal support for the network is to be phased out whenever commercial networks are able to adequately support U.S. researchers.

NREN legislation failed to win congressional approval this

year but will be reintroduced next year.

Commercial entities such as Performance Systems International, Inc. in Reston, Va., are not concerned that the government will no longer be directly subsidizing the network.

Institutions or companies will buy services from commercial providers, said Marty Schoffstall, vice president and chief technical officer at Performance Systems. It will be up to the service providers to tie into a national network.

Complicating the transition is the fact that there is no formal body to sort out the thorny legal and policy issues that are cropping up as Internet grows and

takes on commercial dimensions, according to Lance J. Hoffman, a professor of computer science at George Washington University.

Hoffman said nontechnical people such as lawyers and policy experts should be involved in setting Internet policy. "The essence is, is this a research network or a replacement for the telephone system? These are not technical issues, and we shouldn't be asking the technical folks."

An Internet policy currently limits its use to activities that support research and education. However, in a commercial environment, network users and managers will see many existing

restrictions dropped, leaving the network open to a myriad of transmitted junk that could clutter mailboxes and eat up network and host resources.

Some, such as Scott Cokely, systems administrator at Rockwell International in Newport Beach, Calif., complained about solicitations from vendors, but most believe that junk mail won't become an unbeatable problem.

"To some extent, I'm protected because the sender has to pay," said Dave Clark, senior research scientist at MIT's Laboratory for Computer Science. "But if my computer starts using up 50% of its cycles in finding and deleting junk mail, then I'd worry." He added that those who use the Internet would likely be adept at finding electronic ways to foil abuses.

Casting a wide-reaching Internet

Internet is a loosely coupled network of networks — approximately 5,000 of them in 35 countries serving more than 3 million users.

The largest component of Internet is the National Science Foundation's NSFnet, which consists of a 1.5M bit/sec. fiber-optic backbone — now being upgraded to 45M bit/sec. — linking about two dozen regional networks. The regional networks in turn connect hundreds of local-area networks at campuses and government and industrial laboratories. Last month, one terabyte of data flowed over the NSFnet backbone, and use is growing at about 20% per month.

Three other major Internet backbones, sponsored by the Departments of Defense and Energy and the National Aeronautics and Space Administration, connect to the NSFnet backbone as well as to their own subordinated networks. All of these are predominantly Transmission Control Protocol/Internet Protocol networks.

The NSFnet backbone is funded by the NSF, the state of Michigan, IBM and MCI Communications Corp. and is managed by Merit, Inc., a consortium of Michigan universities. The regional networks are partly funded by NSF and partly by its member institutions. The campus-

based networks are generally paid for by their respective institutions, although many of their users are doing research funded by NSF and other federal agencies.

Internet has electronic mail gateways into several commercial services such as MCI Mail, Sprintmail and Compuserve. Reston, Va.-based Performance Systems International operates one of the regional components of NSFnet and sells network services that connect to Internet.

Late in 1992, the NSF's cooperative agreement with Merit expires. At that point, the NSF could renew the agreement or adopt some other funding mechanism. In any case, the NSF is likely to eventually end direct funding of the network and instead support it through its research grants to universities or network users who would pay fees to commercial managers of the network.

Meanwhile, work and funding for the NREN is picking up steam. A bill sponsored by Sen. Albert Gore Jr. (D-Tenn.) failed to clear Congress this year but will be resubmitted next year. However, several agencies are moving ahead anyway to beef up the existing NSFnet and to do research for NREN, a nationwide, fiber-optic successor to NSFnet operating at speeds above 1G bit/sec.

J.A. SAVAGE and GARY ANTHERS

Citizens' arrests

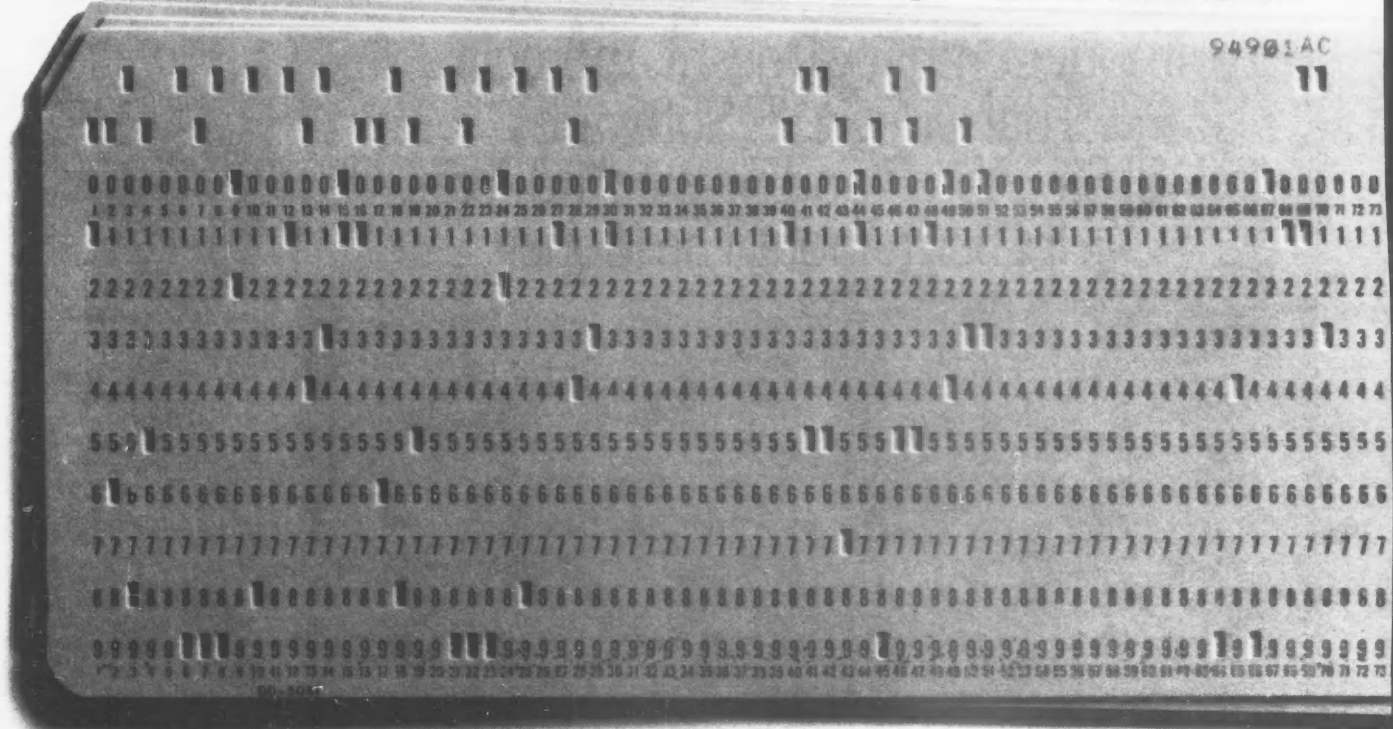
Currently, users can gang up on abuses in a form of citizens' arrests in which abusers are asked to stop disrespectful behavior, said Vinton Cerf, chairman of the Internet Activities Board. "Quite honestly, it's remarkably effective." He said no abuser has been forced off the network.

Other questions include whether the network should be run on a nonprofit basis or for profit and whether, as a commercial venture, it should be regulated like a utility.

The NREN funding proposal simply directs that the network have accounting mechanisms to support user charges. It also directs an interagency committee to investigate and report to Congress on issues relating to how commercial information providers should access the network and pay for that access.

A Senate staffer who worked on the bill said Congress would play a limited legislative role in sorting out commercial issues but had tried to anticipate some of them.

Only The Most Advanced RDBMS Can Relate To This.



Today, you need on-line, real-time access to information.

No matter where it resides. No matter what form it takes. No matter how old it may be.

Only SYBASE seamlessly integrates data sources of every kind into an advanced client/server environment. Data from an RDBMS or flat files, SQL or non-SQL. Application services like electronic mail. Real-time data feeds like stock quotes, satellite transmissions, process control data. And most important for mainframes, SYBASE leverages legacy applications written in PL1, COBOL, or Assembler that

you can't afford to rewrite.

SYBASE mainframe access is through SNA and CICS to provide both turnkey access to DB2 and transaction specific access to VSAM, IMS/DB or any other data source accessible from CICS. (IMS/DC support is coming.) This preserves pre-existing mainframe security and integrity rules, so you can do far more than decision support—you can now integrate new transaction processing applications with old ones.

In short, you can safely make your mainframe a server.

In today's real world of multi-vendor environments—including

MVS, VMS, UNIX, and OS/2, with PC and Mac integration—SYBASE lets you leverage prior hardware and software investments while keeping your options open for the future.

To find out what else the most advanced RDBMS can do for you, call 1-800-8-SYBASE. We'll be happy to give you the time and place of the next free Sybase Seminar nearest you.



SYBASE

Client/Server For The On-Line Enterprise

For seminar reservations or information on the 1991 Sybase User Meeting and Training Conference (January 6-10 at the San Francisco Hilton) call 1-800-8-SYBASE.

© Sybase, Inc. 1990. Other company or product names may be service marks or trademarks of their respective companies.

Unix PC

FROM PAGE 1

simplicity, where once there was only hair-pulling frustration, is making Unix more popular. "Unix has drawn a lot more attention because it's become so much easier to use," said Fred Schwedner, director of engineering at Adobe Systems, Inc.,

a former bastion of Apple applications. Schwedner said Adobe is readying a version of its Illustrator graphics program for Unix because "we've got to play both sides of the fence."

Developers also said they see Unix as the great leveler for users who must juggle operating environments with disparate systems. "It's essential that we provide a package that works on

many platforms, not just one or two," said Chris Williams, director of marketing at Fox Software, Inc. in Perrysburg, Ohio. Fox is working with SCO to produce a Unix version of its Foxpro database application next year, Williams said.

Networking software provider and Apple stalwart Farallon Computing, Inc. is readying a combination router and termi-

nal-emulation package that allows Macintosh systems to hook up to and quickly integrate into Unix environments, according to Farallon President Reese Jones. The package will be ready by the second quarter of next year, he said.

Economics is a major factor in the shift to Unix. As the U.S. PC industry begins to slow down, many developers hope to take up

the slack by focusing on Europe, where Unix is already very big.

"Europe has firmly embraced Unix, and that's one market we're targeting very deliberately," said Ron Zamboni, senior vice president of research and development at Cognos, Inc. in Burlington, Mass. "Unix still has a long way to go before it offers all the benefits of some proprietary systems, but if the people want it, we'll give it to them." Cognos is working on a version of its Powerhouse fourth-generation language for delivery on Unix in 1991.

Other developers said that as PCs and workstations continue on their price/performance collision path, there will be a tremendous crossover of PC users to workstations. "PC users will want to break through to the

If Your Company Doesn't Appreciate That Our CASE Software Will Save You Blood, Sweat, And Tears, Tell Them About The Money.



Designing data models without CASE is a pain in the neck. Doing it with existing CASE software is somewhat less painful—but very expensive.

Introducing AD/VANCE™ DataModeler from On-Line Software. The first menu-driven CASE tool for mainframes. Not only is it easy to use, it's actually affordable.

While PC-based CASE software can cost as much as \$20,000 per developer, AD/VANCE DataModeler requires one modest license fee for all users.

AD/VANCE DataModeler is the first in a series of CASE tools from On-Line Software. A series designed to provide a low-risk path to CASE today and a smooth migration to IBM®'s AD/Cycle* tomorrow.

AD/VANCE DataModeler is designed to provide the corporate benefits of CASE by controlling data models and standards centrally on your mainframe, and it interfaces with PC CASE tools. What's more, its unique built-in model validation facilities automate quality control and help you master database development needs faster, better and with complete data integrity. And because it's ISPF*-based, it reduces training time.

AD/VANCE DataModeler refutes the notion that "to get more, you have to pay more."

For information, call 800-642-0177. In Canada, call 416-620-4844. Outside the U.S. and Canada, call 44-71-631-3696.

On-Line Software
INTERNATIONAL

AD/VANCE DataModeler is a proprietary software product of Tata Consultancy Services. IBM is a registered trademark of International Business Machines Corporation. *Indicates a trademark of IBM Corp.

UNIX CONTINUES to remain the Baskin Robbins of the computer industry: 26 flavors and counting."

DONALD MCGOVERN
UNIX SYSTEM
LABORATORIES

more powerful environment Unix offers, but they won't want to leave behind their PC applications," said Aruel Voyer, executive vice president in charge of operations at Ventura Software, Inc. in San Diego, Calif. Ventura plans to make a Unix version of its Publisher application available in stores by the second half of next year, Voyer said.

The road to Unix, however, is not without bumps. Although it was designed to promote unity, Unix has sometimes caused more strife than stability. The so-called "standard" system is anything but uniform.

"Unix continues to remain the Baskin Robbins of the computer industry: 26 flavors and counting," said Donald McGovern, director of Unix Desktop Technology at Unix System Laboratories, Inc. in Summit, N.J.

Curiously, some developers said the friction has only heightened interest in Unix. "I think the standards battles have brought it up to the eyes of the business user like never before," said Lisa Landa, a spokeswoman at Lotus Development Corp. in Cambridge, Mass. Landa said Lotus will continue to push its Unix applications; Lotus Chairman Jim Manzi even addressed the Unix Expo last month.

Groups such as the Open Software Foundation are trying to smooth the differences, but the many implementations highlight the fact that the promise of portability is not yet fully realized; the selection of one of these variants can lock the user into a particular hardware platform.



When HarperCollins Publishers wanted to put together a best seller, we helped them make some important revisions.

For HarperCollins, being number one in the publishing world was tops on the list.

So they implemented a strategy of merging with other publishers, namely Scott Foresman, who would complement their existing capabilities and take them to new heights. There was one catch, however: Foresman operated on IBM computers and HarperCollins operated on Digital.

That's when Software AG entered the plot.

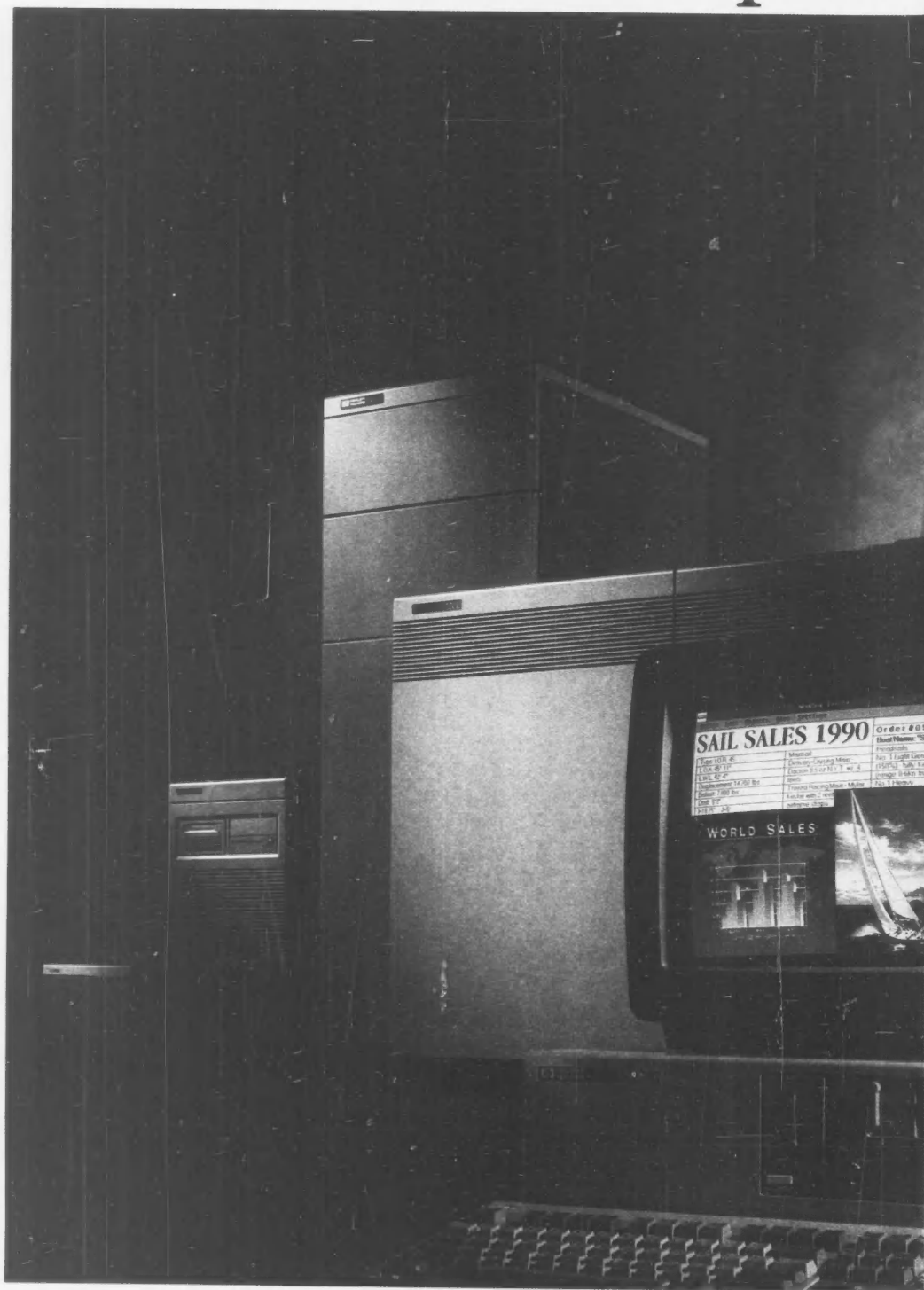
With the help of our NATURAL integrated toolset, HarperCollins combined every major application and database on their computer systems with those of Scott Foresman in less than four months.

"NATURAL transformed both our systems into one open environment," says Gary Sarkesian, Director of Applied Technologies. "In essence, it removed the technological barrier that was preventing our two companies from becoming a unified business power."

Today, HarperCollins is closer than ever to their storybook ending. And that's good news for us. Because only when our customers attain success can we say the same for ourselves. For more information, call 1-800-843-9534. (In Virginia, call 703-860-5050. In Canada, call 519-622-0889.)

Your success is how we measure ours.

 **SOFTWARE AG**



nted power within your reach. it within everyone else's.

With most computers, you have to give up power to save money. And whatever level of power you settle for, it's usually difficult for anyone but an expert to use.

Hewlett-Packard has a better way.

Our full line of RISC-based computers offers a wide range of power levels. At prices that let you base your choice on performance rather than budget.

And when you add HP's NewWave Office system, people can put this power to use quickly and easily from their desktop PCs. Which leads to the kind of productivity computers have always promised, but rarely delivered.

37 computers give you the choice of power you need.

That's a pretty impressive number of RISC systems. But the numbers that will impress you more are right on your bottom line. Our RISC minicomputers start at under \$15,000. Our high end of the power spectrum gives you mainframe performance at minicomputer prices.

Of course, the initial price is only one part of the equation. Since RISC architecture is simpler, it's fundamentally more reliable. And that means lower maintenance and service costs. In short, a dramatically lower cost of ownership.

If you think you can get these advantages from DEC and IBM, think again. DEC doesn't offer a complete range of RISC systems. And IBM only offers RISC technology in workstations.

The competition can't offer you the same level of software compatibility, either. If you went with IBM, you'd have to migrate across different families to even approach

the range of computing power we can provide in a single compatible HP systems family.

Finally, power that people find easy to use.

That's the whole idea behind HP NewWave Office system. Its unique object-based technology lets all of your information resources work together. And gives users a consistent interface across mainframes, minis, workstations and PCs.

It also integrates information from your current applications and integrates existing DOS applications, regardless of the vendor. IBM OfficeVision doesn't. What's more, HP NewWave Office is based on industry-standard networking, and runs on HP's UNIX* system-based computers, HP 3000 systems and OS/2 operating systems.

Beyond this, HP NewWave Office incorporates an extraordinary new "agents" capability. Agents can handle a wide range of sophisticated tasks. For instance, they can automatically gather data, analyze it, generate a report and distribute it.

The net result of HP's approach is this: Applications and information are right where people want them—at their fingertips. Which puts real power where it's needed most. The kind of useful power you always hoped to get out of your company computer system.

Call us at 1-800-752-0900, Ext. 1477 for more information. We promise a very powerful experience for you, and for everyone else in your office.



What, exactly, is the value of MIPS?

Consortiums striving to define single benchmark standard for the computer industry

BY SALLY CUSACK
CW STAFF

Analysts list Amdahl Corp.'s top-of-the-line, eight-way multiprocessor at 350 million instructions per second (MIPS). Hitachi Data Systems Corp.'s megamainframe is rated at 150 MIPS. But while some third-party vendors talk in IBM MIPS, Digital Equipment Corp. speaks in VAX units of performance (VUP), and others have their own rating schemes, leaving users to decipher which machine

stacks up best for their needs.

There is no single definition of a MIPS rating, but until flexible benchmarking programs become a reality, it appears that information systems directors at major U.S. corporations will be forced to use the outdated MIPS method as part of their purchasing strategies.

"People are very confused about this whole area," said Kim Shanley, who is serving on two consortiums established to create standard benchmarks within the industry. Spec caters to the stand-alone, technical workstation environment, while the Transaction Processing Performance Council (TPC) targets the commercial transaction-processing market.

According to Svend Hartmann, president of Computer Merchants, Inc. in Hawthorne, N.Y., a MIPS rating is a "crude measure," but it is valuable in its simplicity. "It serves as a raw kind of comparison," Hartmann noted, "but it does provide an easy way of comparing the relative power of IBM mainframes."

"It's an important part of the mainframe decision," said Michael W. Byrnes, vice president of MIS at Harcourt Brace Jovanovich, Inc. "MIPS plus memory plus operating system plus application software — they all come together to form the entire picture."

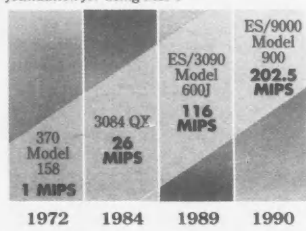
James Vaselek, vice president of data processing at Kay Jewelers, Inc. in Alexandria, Va., concurred that MIPS is "an important part of the overall algorithm." However, he added, MIPS speed in itself becomes less important in a distributed processing environment because of the varied stresses put on the system.

IBM itself does not use MIPS ratings in the traditional sense. The firm has developed the Internal Throughput Rating (ITR). Dick Schardt, IBM's manager of processor performance evaluation at its Washington, D.C., systems center, said the ITR method is simple.

"We take the number of transactions, divide that by CPU utilization, and the result is the ITR," Schardt said. He added that 10 or 15 years ago, the single-number MIPS ratings were an accurate means of measuring CPU performance. However, he said, in the world of real-time transactions, single-number measurements

Starting point

By today's standards, the IBM 370 Model 158 was anything but hefty, but it did provide the foundation for using MIPS



CW Chart: Paul Mock

are no longer valid.

Over the years, hardware vendors have developed MIPS in various forms.

DEC developed its own version of the MIPS rating: the VUP, based on the median of a benchmark's results that DEC attained on the VAX-11/780 system, and the VAX MIPS, obtained by running the Dhrystone benchmark and dividing it by 1,757 — the number that is attributed to

the VAX-11/780.

Users of Unisys Corp. machines have their own particular ratings to consider when making a purchase decision: the Relative Performance Measurement (RPM). According to a spokesman, the RPM illustrates the relationship between older Unisys machines and newer models. The RPMs are based on benchmarks developed internally by Unisys engineers.

Blake Wilkinson, manager of data processing at Amalgamated Sugar Co. in Ogden, Utah, is converting from a Unisys B series machine to the A series mainframe. He admitted to using a "cheat sheet" card that compares the Unisys RPMs with IBM machines assigned a MIPS rating, but he said while the card is a good guide, it by no means provides a final answer.

Vendors and users agreed there must be a common work load established: "one that everyone has agreed upon and that no one will tinker with," Shanley said. To that end, the TPC, with 36 members including DEC, Hewlett-Packard Co., Control Data Corp., Sun Microsystems, Inc., Unisys and Oracle Systems Corp., has detailed specifications written for two approved benchmarks.

Looking ahead, Shanley conceded that it is going to be a long haul. "We have to look at these groups as ongoing, permanent institutions," he said. "We will never have one benchmark that will represent every dimension of computing."

BLAST
Very fast, very reliable
software that connects
everything!



If your communications software
doesn't stack up, call
1-800-24-BLAST.

or write:
Communications Research Group
5615 Corporate Boulevard
Baton Rouge, Louisiana, U.S.A. 70808
A U.S. Robotics Company

Definitively speaking...

Below are several general definitions of commonly used benchmarks:

- **Linpac:** Written in Fortran, this benchmark was designed to solve a dense system of linear equations and has become a de facto industry standard measurement of floating-point performance.
- **Whetstone:** Originated in 1970, this is a synthetic benchmark (meaning it does not solve any real-world problems). Performance is related to hardware features and performance, the system's math library and the efficiency of the code generated by the compiler.
- **Dhrystone:** A synthetic benchmark originally developed to approximate program development and office automation applications.
- **Transaction processing:** A disk-intensive test representing commercial applications that measures performance in a multiuser setting of 20 users.
- **Ghrapstone (graphics):** Based on 122 tests that measure drawing rates for a variety of graphics elements.
- **Khornerstone:** Developed to represent computer performance in a mix of scientific and commercial applications. The results are based on 22 tests measuring CPU, disk I/O and floating-point performance.

SALLY CUSACK

Version Merger eases strain of upgrading IBM software

BY JOHANNA AMBROSIO
CW STAFF

What do you get when you cross off-the-shelf mainframe software that has been customized with a new version of the same software? Chaos, generally, which is what a new tool aims to reduce.

Version Merger, announced last week by Skillman, N.J.-based Princeton Softech, Inc., was designed to help information systems shops reconcile different versions of IBM mainframe software.

Many large IS departments buy packaged software and change it to meet their unique requirements. Problems arise

when a new version of a software package is delivered, because it is often difficult to figure out how to change the upgraded version to reflect previous customization.

That is where Version Merger comes in. It can reduce, by 30% to 50%, the time required to fit site customizations to a vendor's new release, according to Joseph Allegra, president of Princeton Softech.

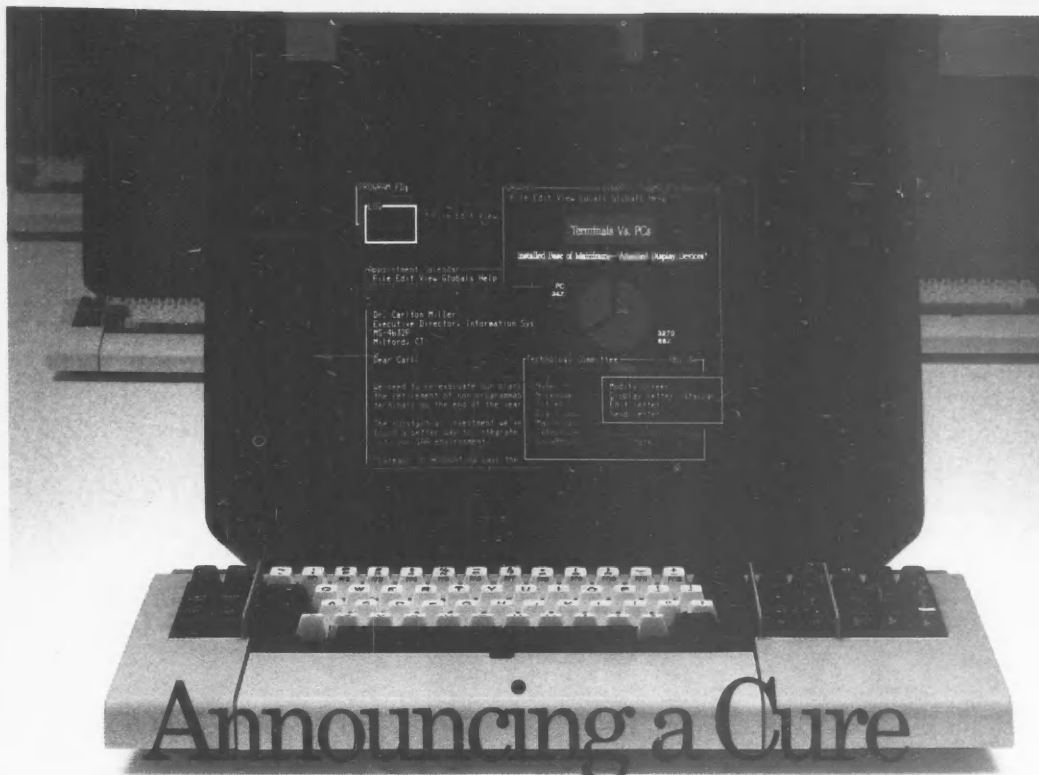
The tool compares three versions of the software — the original, the one with the user organization's changes and the new release. An "intelligent merge editor" identifies conflicts and differences, makes the changes requested and helps test the results.

Karen Piza, an application support analyst at Warner-Lambert Co. in Morris Plains, N.J., used Version Merger in a feasibility study on upgrading AMAPS, a manufacturing package from Dun & Bradstreet Software. AMAPS contains over 5,000 modules, and Version Merger helped Piza's team determine that they would have to modify about 1,000 modules in order to do the upgrade.

"The time required just to assess the impact of a new release can be days or even weeks. Version Merger shortened the impact analysis to minutes," Piza explained.

Version Merger runs under IBM MVS and is available now for \$17,500.

Princeton Softech, a private company founded 14 months ago by former executives of Applied Data Research, Inc., sells two products and has approximately 35 customers, Allegra said. The firm "is profitable," he added.



Announcing a Cure for the Terminal Blues

Now they're calling it a *non-programmable* terminal. Which might make you think technology has simply passed it by.

At SAS Institute, we see things a little differently. After all, your mainframe—and the thousands of terminals attached to it—are the backbone of your business. Not to mention your largest single investment in computing. And we just don't think you should have to replace that investment to enjoy the interactivity of a PC environment.

Just get the SAS® System of software.

Bring the Individual Productivity of a PC to Your Mainframe.

Only the world's leading applications system could bring the look and feel of SAA/CUA to your mainframe...and breathe new life into your 3270 terminals. Just point and shoot to gain *total* control over your strategic data-driven tasks: data access, management, analysis, and presentation.

Pull-down menus and pop-up windows make it more intuitive than ever to take advantage of the SAS System's wide range of applications—from

report writing and graphics to decision support and applications development.

Let the SAS System point the way to greater productivity on *your* mainframe...on your minicomputers and UNIX®-based workstations...and on your PCs running OS/2® and MS-DOS®. Wherever you choose to run the SAS System, you'll get fast-and-friendly software backed by expert technical support, consulting services, documentation, and training.

All from SAS Institute Inc., one of the world's most respected names in software. For a SAS System executive summary, plus details about how you can receive the SAS System for a free trial, give us a call at 919-677-8200. In Canada, call 416-443-9811.



SAS Institute Inc.
Software Sales Department
SAS Campus Drive
Cary, NC 27513
Phone 919-677-8200 □ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc. UNIX is a registered trademark of AT&T. SAA and OS/2 are registered trademarks of IBM Corp. MS-DOS is a registered trademark of Microsoft Corp.

*Computer Intelligence, La Jolla, CA.

Copyright © 1990 by SAS Institute Inc. Printed in the USA.

The SAS® System Executive Briefing... Coming Soon to Your Area

Join us for the SAS System Executive Briefing. You'll learn how the world's leading applications system can help you exploit your organization's most strategic asset—data.

Designed for information executives, this free half-day session gives you a firsthand look at the SAS System's integrated applications...and shows you how to extend these applications to more users than ever before.

Plan now to attend 1990 sessions in the following cities:

CA	Irvine	Sept
	Sacramento	Sept
	San Diego	Oct
	San Francisco	Oct
CO	Denver	Nov
FL	Jacksonville	Nov
	Tampa	Sept
IL	Chicago	Sept,
		Oct, Nov, Dec
MA	Boston	Sept
MD	Rockville	Oct
MI	Detroit	Sept
MN	Minneapolis	Oct
NC	Cary	Oct,
		Nov
	Charlotte	Oct
	Winston-Salem	Oct
NE	Omaha	Sept
NJ	Edison	Nov
	Saddle Brook	Oct
NM	Albuquerque	Sept
NY	New York	Sept
	Poughkeepsie	Oct
OH	Cincinnati	Sept
PA	King of Prussia	Nov
	Pittsburgh	Sept
RI	Providence	Oct
SC	Columbia	Oct
TN	Nashville	Nov
TX	Austin	Oct
	Dallas	Nov
	El Paso	Sept
	Houston	Oct
	Midland	Nov
UT	Salt Lake City	Nov
WI	Madison	Dec
WV	Charleston	Oct

Canada

Montreal	Oct
Ottawa	Sept
Toronto	Sept,
	Oct, Nov, Dec

I would like to attend a free SAS® System Executive Briefing.

Please contact me with registration information for the Executive Briefing in (city) _____ in the month of _____

Name _____ Title _____

Company _____

Mailing Address _____


City _____ State _____ ZIP _____ Telephone (_____) _____

I will be using the SAS System on the following hardware _____ in these operating environments _____

My specific applications needs include: _____

Mail to: SAS Institute Inc., Attn: Executive Briefings SAS Campus Drive Cary, NC 27513

For registration
information, mail
the coupon at left.
Or, call 919-677-8200.
In Canada, call
416-443-9811.



*I'm sitting in a
about my son
above our house
I told him that
hand; however,
some unknown
and my little boy
MAINTENANCE
come up with
actually happen.
switch is devoted
for the tip and he
fly right, Dad,
for me going to*

corner office on a round planet and I'm thinking
and how last night he looked at the crescent moon
and said, "Daddy, broken moon, broken moon." And
the moon would be fixed soon by a silent and unseen
the PBX that I bought for the corporation from
company might not be fixed any time soon at all,
who is only five said, "Dad, AT&T has a REMOTE
lab in Denver set up to detect any problems that might
their DEFINITY® System and fix them before they
You see, Dad, a full 1/3 of the memory of a DEFINITY
entirely to self-maintenance." And I told him thanks
looked up at me and said, "Straighten up and
because no silent and unseen hand is going to pay
college."

AT&T provides several levels of remote maintenance and diagnostic services around the clock. Please call
1 800 247-1212, Ext. 106, for more information or a free copy of THE AT&T CATALOG. In Canada call 1 800 387-6100.



AT&T

The right choice.

ADVANCED TECHNOLOGY

TECH TALK

Very VGA

■ Definicon International in Placentia, Calif., has introduced a Video Graphics Array (VGA) board that the company claimed delivers high-resolution graphics comparable with those of the IBM 8514/A and adapters based on the Texas Instruments, Inc. TIGA interface specification at one-third the cost. The new CAD Resolution and Color Enhanced board generates two to three times the number of pixels that can be displayed by conventional 1,024-by-768-pixel VGA graphics boards, producing flicker-free color images of near photographic quality, the company said. The board is priced at \$495.

A shaky sea floor

■ For the next eight years, a Seafloor Earthquake Measurement System (SEMS) developed by scientists at Sandia National Laboratories will monitor undersea seismic disturbances 10 miles off the coast of Southern California. The SEMS is 50 times more sensitive than earlier versions, and it is expected to detect an average of five earthquakes in the region per year, with Richter scale magnitudes of 3.0 and greater, project leader Gerard Sleaf said. SEMS consists of a sea-floor electronic package that records seismic data and transfers it to a shipboard receiver using underwater acoustic telemetry.

Clean machine

■ Researchers at Sandia National Laboratories are developing robots capable of mapping and removing radioactive waste from leaking underground storage tanks. A robot equipped with ultrasound, active computer vision, ground-penetrating radar and metal detectors makes three-dimensional maps of the surface and subsurface contents of a storage tank. The robot can also be equipped with a variety of attachments to break up hardened waste deposits, cut solids into pieces small enough to be carried by a grabber and suck up materials.

Is the cure worse than the disease?

Scientists mull over wisdom of siccing good viruses and worms on their bad brethren

BY MICHAEL ALEXANDER
CW STAFF

If there are "bad" viruses and worms, why not "good" viruses and worms? Imagine a program that is designed to seek out malicious code and destroy it, perhaps ridding a computer of the problem even before the user is aware of it.

About two years ago, computer scientists at Hebrew University in Jerusalem devised such a "good" virus, which sought out and erased a malicious virus that would have deleted files if left to run unhindered.

Some antiviral products already on the market are able to hunt down and kill viruses, but they may not do a good enough job, according to some experts. "Antiviral software is a disservice to computer security, because it is not securing the device," said Thomas Sobczak, vice president of Application Configured Computers in Baldwin, N.Y., a security consulting firm and antivirus software publisher. Sobczak said that it may be impossible to protect against a virus. "It's like in weapons development — for every weapon, somebody can make a better weapon."

The hunter-killer question

Application Configured Computers, as well as university researchers and other virus experts, are mulling over the wisdom of developing "hunter-killer" viruses and worms that would roam in search of pieces of code that do not behave in predictable ways or alter executable files without authorization.

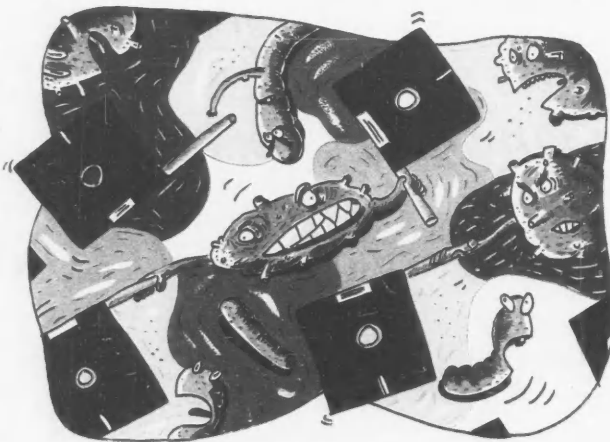
"We developed a Unix-based worm called a 'tandem cooperative processor,'" Sobczak said. "The program looked for anomalies, and if it saw an anomaly, it would derail the processing stack so it did not get executed."

Whether such programs will actually ever be used is questionable. Even

though they are well intentioned, they could end up doing more harm than good. Computer programs are seldom errorfree, for one thing. When a virus is replicating, it attaches itself to other programs, thus changing them. A hunter-killer virus would have to change the programs again to revert

data after the personal computer has been rebooted a preset number of times.

"The question is how to do it in a way that if the program doesn't work like expected, it won't mess up everything else," said Lance Hoffman, a professor of computer science at George



M.E. Cohen

them to their original forms. A minor programming glitch could result in a hunter-killer virus that would eat not only the virus but also the good code.

Some experts worry that a good virus or worm could be modified and sent out to do damage. The Den Zuk, or Search, virus was originally created to seek out and eradicate the Pakistani Brain virus, written by a computer programmer who owned a small software store in Lahore, Pakistan. The original Den Zuk will remove the Pakistani virus, but subsequent versions will reformat a hard disk drive and completely wipe out programs and

Washington University in Washington, D.C. "Not enough study has been done on that. Would I, if I were given the opportunity to, say, write a network worm to do good things? I probably wouldn't because of the liability issues involved."

Even good viruses would interfere with computer systems, spread without users' consent and modify executables. There is simply too much risk involved, said David Stang, director of research at the National Computer Security Association in Washington, D.C. "Virus researchers are unanimously opposed to the concept," he said.

Bellcore steps toward holographic memory

BY MICHAEL ALEXANDER
CW STAFF

A team of researchers at Bellcore recently demonstrated a technique for quickly retrieving single-page video images from a crystal — a step toward developing computers with holographic memory.

The scientists said that the technology could be used in low-cost multimedia computers that could store at least 10 times more information and retrieve it at speeds approximately 1,000 times faster than today's computers. "With expanded capacity, multimedia computers could become as popular as the VCR," said Eung-Gi Paek, a Bellcore researcher. Paek said

the research team plans to build a prototype that could be used to retrieve full-motion video images.

Small size, big capacity

Bellcore's three-person research team used an array of ultrasmall lasers and photorefractive crystals about the size of sugar cubes whose optical properties can be altered by light. A crystal measuring one cubic centimeter could store up to one million holographic images, according to Bellcore.

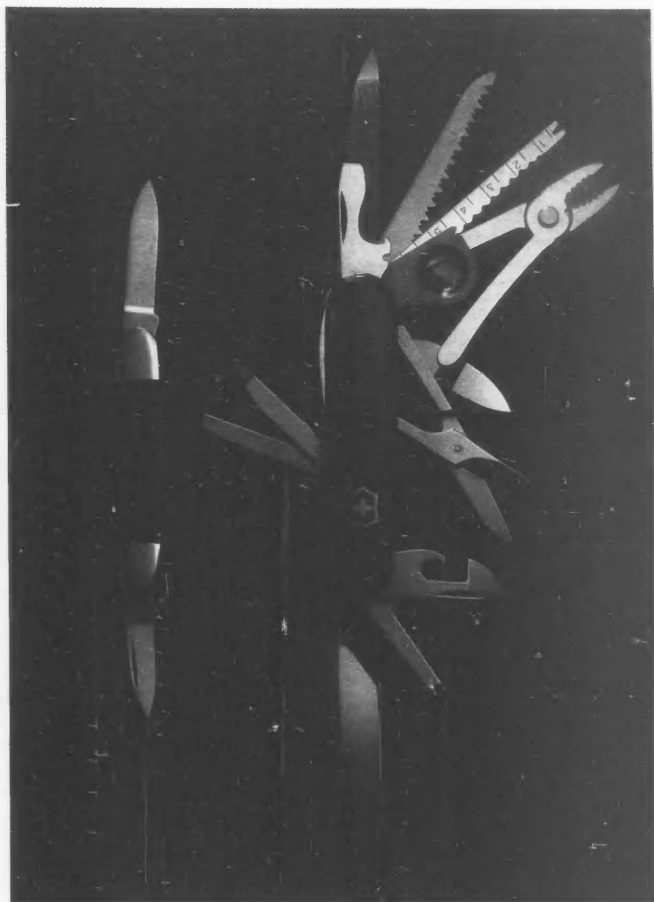
The researchers recovered the equivalent of an 8½-by-11-in. page of text from a prototype crystal storage system in less than 1 nsec, or one-billionth of a second. They estimated that a computer system with holographic memory could store more than 1G

byte of data.

The technique involves taking light from a microlaser only 40 millionths of an inch wide and dividing it into two separate beams. Information in the form of an optical image is then carried along one of these beams, while the second beam serves as a reference beam for the first. Light-regulating modulators, powered by electrical current, combine the two beams in the crystal to create three-dimensional holographic images. The images resemble light and dark lines spread in microscopically thin bands.

The stored information, now a holographically recorded memory, is retrieved when illuminated by the original reference beam, comprised of an array of micron-size lasers.

Ordinary Session Management vs. TPX[®]



Ever hear your users clamor for session management? Probably not. But just try to count requests for faster access to multiple applications and databases. And for integration of applications.

Your users need more than conventional session management. They need a tool that delivers timely information in a form that boosts responsiveness and productivity. They need a network tool that takes them beyond session management. They need TPX from LEGENT.

TPX goes beyond session management to provide the power of Application Integration and present information from multiple applications on a single customized screen. And TPX can provide SAA/CUA compliant panels as well.

But perhaps the most exciting aspect of TPX is its efficiency. With its modular, streamlined, multiserver architecture, TPX provides functionality with no compromise to overhead. You get the power you need without exhausting resources.

Find out why over 1800 data centers worldwide have already chosen TPX for session management... and a whole lot more. Contact your local LEGENT account representative or call 800-323-2600 (412-323-2600 in Pennsylvania). Free 30-day trials are available for MVS and VM environments.

TPX: Beyond session management.


LEGENT

EDITORIAL

Storm-proofing

Amid the gloom-and-doom recessionary talk comes a glimmer of light: The manufacturing sector appears to be absorbing the economic blows better than at any other time in recent memory. No doubt the painful restructuring of that segment following the 1981 to 1982 recession has a lot to do with that. But there's evidence that information systems are beginning to have a real impact, not only on streamlining the factory floor but also on improving the ways in which products are made.

A lead story in *The Wall Street Journal* last week noted that factory inventories are currently at historic lows, a good thing in times of recession. A *Computerworld* report from Autofact '90 noted that one of the trade show's key themes was using factory integration to speed turnaround times and improve competitiveness. Some industries are poised to enter the unexplored third stage of manufacturing, an evolution that has taken us from the customized, hand-tooled products of the Agrarian Age to the mass-produced homogeneity of the Industrial Age to the threshold of mass-produced, customized products of the Information Age.

We are beginning to see indications that U.S. industry's stodgy, crank-it-out manufacturing mind-set is changing. There is no choice. Buyers are going for the best deals they can get, and the "Buy American" platitudes are ringing pretty hollow when Honda already makes more cars in the U.S. than it does in Japan.

When several of our reporters visited Japan early this year to assess the state of Japanese IS, they were surprised to learn that the Japanese consider themselves to be behind the U.S. in the march toward computer-integrated manufacturing (CIM). How can this be? The answer is that the Japanese approach manufacturing from a completely different perspective. Much more time goes into analyzing the manual process and fine-tuning it before a computer comes into the picture. The Japanese are not heavily into CIM, because they don't think they're ready.

In contrast, U.S. manufacturers have tended to rush into computerization as a cure for problems that are much more deeply rooted. It is that kind of thinking that led U.S. carmakers to install — and later scrap — overly complex, unreliable robots, while Japanese carmakers focused on simple, single-function alternatives. As the consultant Michael Hammer has written, "We have not exploited the power of information technology in our organizations. We have only overlaid it on inherited designs and structures."

But perhaps that is changing. The big-picture management consultants say the 1990s will be a brutal business climate in which the survivors will be those who get to market fastest with the lowest-cost products. Information management has become a vital link in that evolution. U.S. manufacturers who intend to survive will need to listen to the words of Vincent Swoyer, vice president of corporate systems at Sara Lee Corp.: "Information about what's in production is replacing, in value, the inventory on the shelf."

Repetitive Stress Disorders emerging in the computer industry



LETTERS TO THE EDITOR

New learning

In today's world, it is wise to consider the global end effects of a nation's programs and activities. Mr. Perelman's exasperations [CW, Oct. 8] appear to eloquently express the negative impact on the U.S. scene of the unfortunate underuse of computer-based instruction.

However, Mr. Perelman's accurate closing resume of the inadequacies of the public school's classroom platform as "11th-century technology" seems to merit special note. For it also describes in a profound way the sad truth about the education situation on a global scale. There, the negative end effects of this are often much deeper and sometimes tragic.

Abbreviating a complex consideration of the end or context effect of what can easily be disputed as a local-to-America-only action, it simply appears to me that the continued misfiring in the educational direction, which Mr. Perelman identifies, will end up having much more serious consequences than merely "shooting yourself in the foot."

Alann L. Meadows
Systems Analyst
Rio de Janeiro, Brazil

Ambiguous need

In "Group(ware) therapy: Tips for success" [CW, Nov. 5], Paul Gillin points out that most groupware projects fall far short of their potential. One common reason not mentioned in the article is the failure of these products to meet the need for ambiguity. People in work groups don't like to be overly precise, especially when transmitting thoughts to unseen receivers.

Ambiguity in a groupware application — scheduling meetings — is illustrated by the Higgins product. Setting up a meeting using Higgins involves a fair amount of give-and-take. That's fine with those invited, who can use the slippage to gracefully avoid meetings they don't want to attend.

Good groupware guides work team members toward being more precise in their questions, directions, statements and commitments. This does boost team productivity. But first, you have to get the team to accept the groupware. As with all other system designs, acceptance comes from taking the users where they're at.

Bruce Sanders
Psychologist
Workgroup Associates
Vacaville, Calif.

Oh, Henry

DuWayne Peterson's article "Getting ready for staffing squeeze" [CW, Oct. 22] touched on an all-too-common problem — companies being dependent on long-serving employees who alone understand antiquated systems. Many of us have worked for companies where Henry is the only person who can get the payroll system restarted in the middle of the night or who understands why the Boca Raton, Fla., office did not get the correct reports this morning. When Henry goes on vacation, the rest of the organization walks around with their fingers crossed behind their backs.

It's not Henry's fault. The Henrys of this world have been taken hostage by their own management and are keeping the old systems running out of fear.

They are usually working 60+ hours per week, with little or no time for relaxation.

If the guys at the top care about Henry at all, I suggest to them that by following four easy steps, everyone will benefit:

1. Get honest! Admit and accept the situation.
2. Determine where you would like to be, and formulate a plan to get there. Make Henry an integral part of your plan, as you may need that undocumented knowledge he carries around in his head like a time bomb.
3. Make the necessary changes. You've planned for it. Just do it!
4. As you move forward, be sure you are not breeding another Henry.

M. David Baker
Manager, Financial Systems
Scudder, Stevens & Clark, Inc.
New York, N.Y.

Ye, Codd

I consider myself the E. F. Codd of object-oriented systems, although I never thought of the metaphor until I read it in your pages.

Kevin A. Ingram
President
High Biscuit Audio
Systems, Inc.
Bethlehem, Pa.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cockituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.

U.S. tech heading for dead end

WILLIAM C. NORRIS



The U.S. high-tech industry is headed toward second-rate status in global competition. If such a disaster is to be avoided, we must manage technology better. At the same time, there must be a substantial increase in funding by the federal government for commercial research and development.

To manage technology better, we must increase technological cooperation at home and abroad. We must utilize available resources more effectively and gain access to foreign technologies. At the same time, more equitable technology flows must be achieved between the U.S. and foreign countries.

Technological cooperation must be expanded in both R&D and manufacturing. In the U.S., we have already seen a considerable increase in cooperation in R&D among larger companies, universities and government agencies (federal and state).

These efforts must be expanded to include more participation by smaller businesses. Small businesses are a major source of innovative products and services. These objectives

Norris is the founder and chairman emeritus of Control Data Corp.

can be achieved only if the federal government provides more money for commercial R&D. This would stimulate the expansion of cooperation and share the cost and risk of getting next-generation high-tech products into the marketplace.

Foreign governments, especially in Japan and Germany, have assumed a significant portion of the cost and risk of coop-



erative programs to develop generic technologies with broad commercial applications. This support has been a major factor in helping those countries establish dominant positions in a number of high-tech markets.

A similar approach is called for in the U.S. The federal government must provide information, encouragement and part of the funding for technology development programs such as uni-

versity and company consortiums, both large and small. Government laboratories should participate when appropriate. The selection of technology to be developed should remain the primary responsibility of the private sector.

Manufacturing should be a critical focus of these efforts. Expanding cooperation in the manufacturing of high-tech products is key because many U.S. high-tech companies are lagging in the use of advanced manufacturing technology. This is especially true for small and medium-size firms that lack affordable access

to such technology. As a result, they are at a serious competitive disadvantage in global markets.

We should establish advanced electronics manufacturing service centers, where companies pay for the services as they are used, with no investment required in center facilities.

International technological cooperation must be more broadly based, involving many more organizations. This can be

accomplished through interregional cooperation whereby a state or a group of states in the U.S. establishes cooperative activities with counterparts in other countries.

An international, interregional program should have three major components: formation of small-enterprise joint venture companies; cooperation in establishing advanced manufacturing service centers; and cooperation in applied research.

The underpinning for interregional cooperation in applied research is the large number of research centers in many countries. Though they are creating useful results, most do not have funding commensurate with their capabilities and the need

our university research and leading-edge, small-company technology.

The U.S. is not afforded equivalent opportunities in Japan because most of the research in that country is under the control of private companies, and because Japan does not have the same kind of extensive, innovative small-business sector. However, regional efforts are under way there to foster the start-up of high-tech companies.

Considering the support in Japan and Europe for high-tech small-business development and the emergence of high-tech private companies in the Soviet Bloc — and many research centers — there is an unprecedented opportunity for international,

interregional technological cooperation. At the same time, equitable technology flows can be achieved.

Implementing such an audacious, comprehensive program on a global scale is not as formidable a task as it might first appear. Every state has organizations and programs for assisting small companies and fostering applied research. Similar activities exist in most other countries. Thus, for the most part, a support infrastructure is in place. With U.S. dedication to the program, the U.S. competitive position can be greatly strengthened in world markets.

Christopher Bing

Users ready for Unix; is Unix ready for them?

AMY WOHL



Unix conferences are generally cozy affairs. The clan gathers as Unix folk prepare to talk to one another about the arcane issues they adore. Users leave feeling bruised by all the technotalk.

But at the recent Unix Solutions Conference in Anaheim, Calif., something amazing happened. Almost all of the attendees were at their first Unix conference. Most of them were there to learn something about how to use Unix. They were interested in the benefits of open, portable systems, not the fun of belonging to an exclusive club and meeting for one more opportunity to try out Unix jargon. And they were impatient.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

You could hear that as they listened to panels and presentations. Why, they asked, are there so many versions of Unix? How can something be a standard if it's so variable? And if I need to buy a special version of each software package for each hardware platform and operating system version of Unix, then what exactly does portability mean?

In one session, the Open Software Foundation (OSF) and Unix International declined to argue in public over their differing views on open systems (OSF/1, a kind of Unix look-alike vs. Unix International's Unix System V Release 4). They insisted there was plenty of room for more than one player at the table. One disgruntled attendee didn't wait for the formal question-and-answer session after the talk. Instead, he stood up and firmly commented, "OSF and [Unix International] ought to toss a coin and let us know who won. Then we can just get on with this."

Others at the conference seemed frustrated by the con-

tinuing division and duplication of efforts between the followers of AT&T and Sun Microsystems (members of Unix International) and those of IBM, Hewlett-Packard and DEC (members of the OSF). They are tired of the delays that result from developers having to choose which version of Unix (or open systems) they'll write software for first and which they'll port to later. This can be an important issue, because the chosen development environment may not only get software sooner — it may get software that is better optimized to its particular features.

Users wanted to see more applications. Unix marketers are famous for talking about how much software there is. An examination of offerings, however, brings the cold light of reality. Of course there is some real, commercial-quality software for standard applications such as word processing, electronic mail, database management, accounting and so forth. But Unix is heavily weighted in favor of technical software for the engineering community, which it has long served. And there are lots of specialty products for niche scientific applications.

Fortunately, the lack of commercial-quality software should

be ending soon. Many of the personal computer vendors have decided to move their most popular products (Lotus' 1-2-3, Wordperfect, et al) to the Unix platform. As others follow, more choices will be available. They are joining existing Unix developers and minicomputer and mainframe software publishers who have been moving to the Unix/open systems bandwagon.

Meeting user needs

There's more to giving users what they need than producing software, however. Commercial users are not only accustomed to a considerable product selection, they also expect convenient acquisition routes and strong support.

Getting the product to these users will be a challenge. Unix software doesn't fit through the shrink-wrap channel yet. Direct sales are expensive and a barrier to entering the marketplace for many vendors, further limiting the amount of available software.

An intermediary seems to be required. Certainly not the retail store model that succeeded for early PCs. Perhaps a value-added reseller or systems integrator model is called for.

Users are sometimes sur-

prised at the level of support that Unix systems can require. It is, of course, possible to entirely mask Unix from the user, and small business offerings have often chosen this course. But in larger firms, where companies need to get at the system to add users or tools or to do programming, this would be inappropriate.

This means we need new mechanisms for Unix and open systems support from individual software vendors as well as overall hardware and systems houses. The latter are usually prepared to provide support, but software firms entering the Unix market from the PC market will initially find the additional support requirements daunting and must prepare either to meet them or have dissatisfied users.

Unix and open systems offer users substantial benefits in portability, interoperability and freedom of future choice, but commercial users who are attracted to these benefits and are now strongly interested in the open systems market will become disenchanted quickly if Unix vendors are not prepared to offer sufficient choices and excellent support. There is still a lot of work to do here to get the market ready for the users.

**If
you've
called for
connectivity and
gotten
tangled up in
vines...**

We need to talk.

Look closely when someone promises unlimited networking. Many networking solutions are based on proprietary software, and that places serious restrictions on future growth.

Only Wollongong has the software products to effectively connect dissimilar hardware and software, because we base our solutions on open systems standards.

Only Wollongong lets you expand and manage your network, while you preserve the investments you've already made. Because we enhance your present environment, you don't have to give up, trade in, or disrupt your existing network.

In fact, for over 10 years, we've been helping Fortune 500 companies build corporate networks in multi-vendor environments.

So, when you're ready for healthy expansion, don't go barking up the wrong tree.

Call 1-800-872-8649 (in California 1-800-962-8649) or write The Wollongong Group, Inc. 1129 San Antonio Road, Palo Alto, CA 94303.

When you need to network, we need to talk.

WOLLONGONG

The leader in multi-vendor networking.

computers.
Industry observers still see
with its inherent multitasking
functionality, as the eventual PC stand-
ard. For the time being, there is no appeal.

Computer Systems News, May 28, 1990

“Eventually” is here.

ANNOUNCING THE OS/2 YOU'VE BEEN WAITING FOR.



For quite some time, the press has been writing about the move everyone will want to make to OS/2.®

Eventually.

Well, all at once OS/2 1.3 has made OS/2 the operating system it was meant to be—the one you'll want to move to right here and now.

OS/2 LOSES A LITTLE WEIGHT.

For starters, OS/2 has lost some of its appetite for memory. In fact, now you can make the move to OS/2 1.3 with as little as two megabytes on

tivity. The ability to run applications larger than 640K. DOS compatibility. All these features have made OS/2 appealing in the past, but new features have catapulted OS/2 into the here and now.

For instance, now OS/2 1.3 harnesses the power of Adobe Type Manager™ (ATM™).

den in design...
complex applications...
OS/2 will become a more attractive option for the future as users learn to take better advantage of its multitasking, enhanced de-

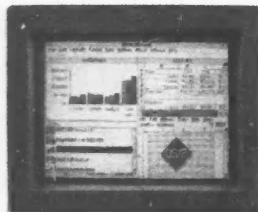
PC Week, August 13, 1990

With this new feature, the quality of screen fonts has improved dramatically, giving you a true WYSIWYG capability so what you see is indeed what you get. ATM

also gives OS/2 more flexibility in document creation by supporting a wide range of outline fonts.

Of course, what

good is all this without printer support? Not much. So OS/2 1.3 has improved and expanded its printer support to include drivers for almost all popular printers.



BUSINESS IS BOOMING.

Now that OS/2 is moving forward, so are software developers. Every day, more and more applications are joining the growing pool of available OS/2 software. In fact, a variety of major business programs, including Aldus® PageMaker®, Lotus® 1-2-3® and Microsoft® Excel, have already made the transition to OS/2.

These, along with many others, have been redesigned to go beyond DOS memory limits and take advantage of OS/2's intuitive graphical interface—Presentation Manager.™

It's been said that eventually

give up a thing to do it.
Eventually, we need OS/2
all the power and safety the
existing system brings.

Will Fastie, The Fastie Report, May 31, 1990

you'll want to take advantage of everything OS/2 has to offer. Well, wait no more because “eventually” is here.

For more information on what OS/2 can do for you here and now, or to get details on a no-charge upgrade to Version 1.3, contact your IBM

Authorized Remarketer or marketing representative.

OS/2 can do!

...will be the
environment that will carry
PC users into the next century.

PC Magazine, September 11, 1990

your system. What's more, this streamlined version leaves more room for applications and will offer some users a substantial performance increase in many system functions.

FUNCTIONALITY. FUNCTIONALITY.
AND DID WE MENTION
FUNCTIONALITY?

Multitasking. Seamless connec-

SYSTEMS & SOFTWARE

Bull takes first CASE steps

Plans to make formal product announcements in early 1991

BY SALLY CUSACK
CW STAFF

BILLERICA, Mass. — Bull HN Information Systems, Inc. recently raised the curtain on company plans to enter the computer-aided software engineering (CASE) market, with formal product announcements scheduled for early 1991.

Bull executives, while enthusiastic about the CASE commitment, were tight-lipped about details, indicating only that the software would run on an Intel Corp. i486-based Unix platform and that the entire suite of products would in some specified way cooperate with the IBM Repository concept.

According to Cory Devor, director of U.S. marketing for

Unix and open systems products at Bull, the company will rely on its own development team as well as a variety of third-party vendors.

While analysts reacted with surprise to the announcement, most acknowledged it as a necessary move in today's market.

According to Vaughan Merlyn, chairman of the CASE Repository Corp. in Bellevue, Wash., most key manufacturers, including IBM and Digital Equipment Corp., are viewing CASE as a strategic marketing component.

Merlyn observed that while the new Bull product line would probably not be a significant revenue generator in the "grand scheme of things, it does get a foot into the door of the IS com-

munity," Merlyn cautioned, however, that Bull may be facing a "tough haul" to establish itself in the CASE arena.

"I'm a little surprised; this is a real challenge for them," said Stuart Woodring, director of software strategy research at Forrester Research, Inc. in Cambridge, Mass.

Looking for tools

However, Bull users have been looking for additional tools and software from their vendor for quite some time, according to Shirley Eick, president of the Bull Users Society.

"CASE is a hot button," Eick said, "and the user reaction will be very positive."

Woodring added, "CASE fits into the whole strategy of sys-

tems integration, something Bull is pushing. This makes sense for Bull as long as the products are good — the CASE competition is fierce, and the user community is wising up."

Woodring speculated that while there are more than 100 vendors in the CASE marketplace today, less than 10 are doing any significant volume of business, and he said he feels that Bull may be trying to follow IBM and DEC's lead by trying to establish a "mind share" in the CASE market.

Lou Mazzuchelli, chief technical officer at Cadre Technologies, Inc., a major player in the technical CASE arena, said that although he was not surprised at Bull's recent move toward that technology, he questioned its timing. "It's a hard time to get into the MIS CASE market, or any market for that matter," he said. "Differentiation is going to be the key, and the question is, will they have it?"

Networks get automated storage

BY MARYFRAN JOHNSON
CW STAFF

When Ray Bates talks about his cross-country job of managing network storage for nearly 240 workstations, he calls it "an amusing task."

Yet, the software manager at the University of Southern California's Information Sciences Institute is hardly laughing.

Between 200 Sun Microsystems, Inc. workstations at the Los Angeles-based university and 30 to 40 Sun machines back in Washington D.C., at a U.S. Department of Defense installation, Bates wrestles daily with backup and storage needs that cannot keep up with user demands.

"We have a lot of Sun servers, and backup is becoming a nightmare," Bates said. "Our operators have a hell of a time backing up the tapes in a timely manner, and users are screaming about them doing this in the daytime."

So when Epoch Systems, Inc. came along with the first pieces of its Renaissance client/server software for automated storage last month, the Westboro, Mass.-based vendor had a ready customer in Bates.

The most welcome news for users such as Bates was Epoch's extension of its automated network management software beyond its own fairly pricey hardware and onto Sun Sparcstations and Sun 3 machines. Epoch servers range in price from about \$60,000 to \$700,000, providing on-line access to high-capacity disk storage over an Ethernet network.

Epoch's specialty since it be-

Continued on page 35

FEATURE: THE OLTP CRAZE

OLTP's fiery display isn't all show

BY MARY LOU ROBERTS

The on-line transaction processing market (OLTP) is sizzling. Many companies are jumping into OLTP in a big way. At the same time, vendors are providing OLTP offerings, enhancing existing products and introducing new ones. Why all the fuss?

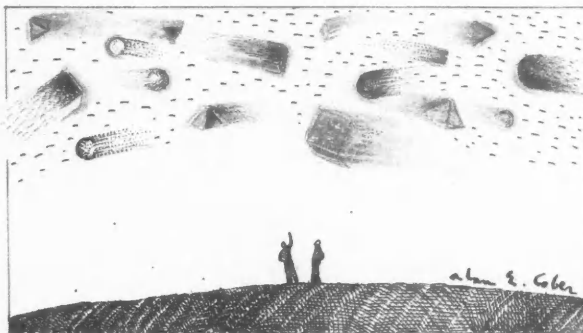
OLTP is more than a solution in search of a problem, users and consultants say. Users find that moving old batch applications to an on-line environment and developing OLTP solutions increases operational effectiveness,

meets the needs of more competitive information objectives and answers end users' demands to act quickly in meeting market pressures.

The fact that OLTP is aligning itself with smaller platforms and open systems may also make it attractive to many users.

"For us, going to OLTP was purely a business motivation," says Rich Chapman, vice president of information systems at health care giant Humana, Inc. in Louisville, Ky. Humana is working on a pilot project to install a Tandem Computers, Inc. OLTP offering for its hospital patient care system. An OLTP will help Humana be more effective in a deregulated market, Chapman says.

Continued on page 34



NAPERSOFT

NAPERSOFT, Inc.
One Energy Center
Naperville, IL 60563-8466
708/420-1515

Treats Customers Write

NAPERSOFT® Automated Correspondence Software handles your written communications to customers quickly, accurately and professionally with:

- On-line or batch letter writing
- On-line notepads
- Spell checker
- On-line letter history
- Full function word processor
- Full printer support

With your IBM mainframe and NAPERSOFT software you can streamline your customers correspondence! NAPERSOFT... for businesses that treat customers write.



FIRST
CLASS
SERVICE



The IEF™ can help you devel unprecedented quality, prod



"The IEF is a superior tool for implementing Information Engineering because it integrates the entire process from planning through code generation. We're deploying the IEF throughout the corporation."

David V. Evans
Vice President
Director, Information Systems
J.C. Penney



"Our On-line Banking system has been in production for more than 12 months—500,000 transactions a day—without a single code failure. And we had very few enhancements to do. Our users got what they needed the first time out."

Mark Quinlan
Senior Programmer/Analyst
Huntington National Bank



"To meet the dramatically reduced time-to-market requirements for our products, we need high-quality systems that can be changed fast. That's why we've chosen the IEF as the CASE solution for our entire organization."

John Pajak
Executive Vice President
Mass Mutual Life Insurance



"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group



"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

John F. Mott
President
AMR Travel Services



"Our users were extremely pleased when we finished our first project—a 60-transaction system—in one-half the budgeted time. We had tried interfaced CASE tools without success. IEF integration makes the difference."

Giorgio Sorani
Division Head - MIS
Lubrizol



"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce



"We used the IEF to rebuild our aging Frequent Flight Bonus system. With DB2 tables of up to 52 million rows, we needed high performance. And we got it...98% of our transactions complete in less than 3 seconds."

Cloene Goldsborough
Director of Data Resource Management
TWA



"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

Open information systems with productivity and maintainability.

The success of Texas Instruments CASE product is proven—in the field.

Major companies have used TI's CASE product, the Information Engineering Facility™ (IEF™), for everything from rebuilding aging high-maintenance-cost systems to development of new enterprise-wide strategic systems.

Study shows zero code defects.

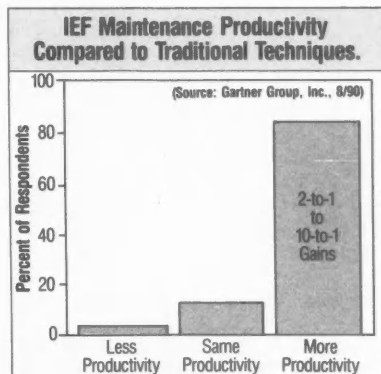
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

Mainframe applications can be developed and tested on a PC.

With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

More environmental independence coming soon—develop on PC, generate for DEC/VMS, TANDEM, UNIX.

The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will

follow. We are committed to increased environmental independence in support of the Open Systems concept.

We are committed to standards.

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's Cohesion—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

For more information, including a VHS video demo, call 800-527-3500 or 214-575-4404.

Or write Texas Instruments, 6550 Chase Oaks Blvd., Plano, Texas 75023.

TEXAS 
INSTRUMENTS



You'll choose our financial software for its technology, but you'll keep it for its fit.

In evaluating financial software for your company, consider this: the technology you buy today is only as good as its ability to furnish your needs tomorrow. Which is why so many corporate leaders have chosen SAA-compliant DB2 applications from Walker Interactive Systems.

In fact, only Walker has the technology to give your company a functionality fit from the start. That's because our unique architecture lets you completely personalize your Walker applications for your business. And no matter how much, how often, or how quickly things change, Walker will keep you operating comfortably.

Just ask any of our clients. While they've grown and prospered, we've become stronger, more focused, and uncommonly consistent.

So give Walker a call, and find out how a good fit today can put your company in a lot more comfortable position tomorrow. Call (415) 495-8811 for more information.



Walker Interactive Systems™



YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of \$38.95* per year — a savings of 62% off the single copy price.

First Name _____ MI _____ Last Name _____
 Title _____ Company _____
 Address _____

City _____ State _____ Zip _____
 Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: \$48 per year

* U.S. Only, Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD



YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of \$38.95* per year — a savings of 62% off the single copy price.

First Name _____ MI _____ Last Name _____
 Title _____ Company _____
 Address _____

City _____ State _____ Zip _____
 Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: \$48 per year

* U.S. Only, Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
 10. Manufacturer (other than computer)
 20. Financial/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government - State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Refining/Agriculture
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 90. Computer/Peripheral Dealer/Distributor/Retailer
 95. User - Other _____
 99. Vendor - Other _____
 (Please specify)

2. **TITLE/FUNCTION** (Circle one)
IS/MIS/DP MANAGEMENT
 19. Chief Information Officer/Vice President/Asst. VP
 IS/MIS/DP Management
 21. Dir./Mgr. MIS Services, Information Center
 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
 23. Dir./Mgr. Sys. Development, Sys. Architecture
 31. Mgrs., Suprv. of Programming, Software Dev.
 32. Programmers, Software Developers
 60. Sys. Integrators/VARs/Consulting Mgt.
OTHER COMPANY MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer
 41. Engineering, Scientific, R&D, Tech. Mgt.
 51. Sales & Mktg. Management
OTHER PROFESSIONALS
 70. Medical, Legal, Accounting Mgt.
 80. Educator, Journalists, Librarians, Students
 90. Others _____
 (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
 Types of equipment with which you are personally involved either as a user, vendor, or consultant.
 A. Mainframes/Superminis
 B. Minicomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Local Area Networks
 F. No Computer Involvement

E4048F-X

1. **BUSINESS/INDUSTRY** (Circle one)
 10. Manufacturer (other than computer)
 20. Financial/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government - State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Refining/Agriculture
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 90. Computer/Peripheral Dealer/Distributor/Retailer
 95. User - Other _____
 99. Vendor - Other _____
 (Please specify)

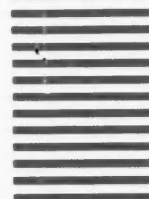
2. **TITLE/FUNCTION** (Circle one)
IS/MIS/DP MANAGEMENT
 19. Chief Information Officer/Vice President/Asst. VP
 IS/MIS/DP Management
 21. Dir./Mgr. MIS Services, Information Center
 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
 23. Dir./Mgr. Sys. Development, Sys. Architecture
 31. Mgrs., Suprv. of Programming, Software Dev.
 32. Programmers, Software Developers
 60. Sys. Integrators/VARs/Consulting Mgt.
OTHER COMPANY MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer
 41. Engineering, Scientific, R&D, Tech. Mgt.
 51. Sales & Mktg. Management
OTHER PROFESSIONALS
 70. Medical, Legal, Accounting Mgt.
 80. Educator, Journalists, Librarians, Students
 90. Others _____
 (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
 Types of equipment with which you are personally involved either as a user, vendor, or consultant.
 A. Mainframes/Superminis
 B. Minicomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Local Area Networks
 F. No Computer Involvement

E4048F-X



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

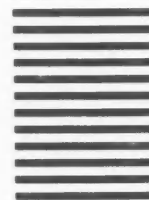
POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



Gerber's bumpy road to AS/400

IS group spends twice as long as expected migrating from System/36

ON SITE

BY MICHAEL FITZGERALD
CW STAFF

FREMONT, Mich. — At Gerber Products Co., the information systems group has traditionally favored mature technologies over those born yesterday. But the last year has seen IS go through the process of bringing up baby — "baby" being an IBM Application System/400 Model B40.

Last year, Gerber installed the AS/400, replacing the IBM System/36 minicomputer that ran the Gerber plant here.

Switching over to the AS/400 hasn't been easy. Gerber has configured its factories in hierarchical fashion, with System/36s sitting between the mainframe host and its personal computers.

Two circa-1981 IBM 3081Ks are linked together and hooked to a 3725 communications controller — all purchased in the aftermarket. There are roughly 100 terminals and PCs (primarily IBM Personal System/2 Model 55SXs) in each of its four manufacturing facilities. The PCs are directly attached to the minicomputer and can pass through it to the host and sign on as a terminal. The mainframes also serve as host for the company's administrative needs.

Gerber brought in the AS/400 to replace the System/36 because it wanted the AS/400's relational database capabilities and needed the extra

disk space and memory.

Although the company considered the System/38, "I really felt that System/38 technology was too old to deal in the aftermarket," said John Kralej, director of corporate MIS. "Since we're on the front end of the AS/400, it looked like a good investment that we could hold onto for a while."

Kralej is not as happy being a new "father" as he thought he would be, though.

"Price/performance is a real issue," he said. "I'm not sure of the throughput I'm getting, and leftover capacity is not as great as I would have expected. There's a lot of room for us to grow, but it's real expensive in comparison to the System/36."

Kralej and his staff have also spent twice as long as expected getting up to speed on the AS/400. The problem has not been in porting applications from the System/36 to the AS/400, which required little more than a weekend, or in converting to native AS/400 code in cases where System/36 emulation mode was not performing well.

Rather, the problem has been learning to program the system while developing a new warehouse inventory locator and management system, written in-house in RPG 400. "It was a bigger learning curve going from the 36 to the AS/400 than I had been led to believe," Kralej said. "IBM worked hard at supporting us, but I'm not sure that they understood the machine, either.

They seemed to be learning along with us."

Kralej said the new system represents a fundamental change in the way Gerber's warehouse employees are used to working. Where workers once were assigned jobs in somewhat random fashion, their forklifts



Gerber's Kralej helped make the midrange switch

now have terminals that direct them every step of the way.

Yet the application has smoothed out, and Kralej said his staff is developing a new plant management application slated for installation in six months.

This month, Gerber is installing an AS/400 Model B45 in its Fort Smith, Ark., plant, upgrading its Fremont AS/400 to the Model B45. The company will install another Model B45 in its Asheville, N.C., plant before the end of the year.

Gerber has also begun new projects on the AS/400. It licensed Lotus Development Corp.'s 1-2-3/M on one of its 3081s. Kralej is pleased with the way users have reacted to it and says the software "really

IBM through Metaphor Computer Systems, Inc., an IBM business partner, under OS/2.

The project aims to make external and internal sales data more readily available to the marketing and sales departments. Kralej said he expects the application to be implemented in the middle of 1991.

One thing Gerber does not like to do is charge into new projects. With the sales data warehouse system, for instance, the company is studying the benefits of the application and what it will take to develop.

"Our management is planning-conscious," Kralej said. "They want you to define what you're going to do — the benefits to be gained from it — and establish milestones that you can measure your progress against."

For instance, Kralej said, Gerber is looking to implement a sales information system in January. The system was designed to allow the company to regularly collect information it has in the past only collected once every six months. Gerber's 530-person sales force will carry portable computers on sales calls and retrieve information, such as product sales, on the spot. At the end of each day, the representatives will feed their information via modem into the mainframes.

"It will allow us to capture a higher quality of data about our products on the shelves, what our competitor has on the shelf, what's changed since the last visit," said Bruce Erickson, Gerber's marketing and administrative systems manager. "It's also used as a notepad to prompt the rep to set up displays, present a new item, that type of thing."

Software plans shop-floor schedules

Product also feeds information into high-level D&B Software system

BY ELISABETH HORWITT
CW STAFF

DETROIT — A finite scheduling product announced this month by Dun & Bradstreet Software's Advanced Manufacturing International Division can determine optimal scheduling on a detailed level for the shop floor and can also feed work-center scheduling information into the more long-term, high-level scheduling system provided by D&B's AMAPS manufacturing resource planning (MRP) II software, the company said.

D&B's new AMAPS Finite Scheduling System uses rule-based algorithms to come up with optimal schedules that balance a "complex array of parts and processes across machines" at multiple work centers, D&B spokesman John Lischefska said.

The system calculates schedules on the basis of available ma-

chine and human resources, scrap and other production information that it collects through D&B's Factory Control and Management System.

It can also take into account business objectives such as quality, on-time delivery and maximizing capacity, which can be weighted by the user, Lischefska said.

"D&B has identified a hot market segment — factory-floor management — which sits between factory control and [manufacturing resource planning]," said Bruce Richardson, a vice president at Advanced Manufacturing Research, Inc. in Cambridge, Mass.

"That area has been a void, but it is becoming important" — particularly as companies move toward "pull-based manufacturing," where production is driven by customer orders, not by "push-based systems," which

are driven by the need to reach a predetermined inventory level, Richardson said.

Traditional MRP systems, which were designed for push-based manufacturing, do not provide the detailed, up-to-the-minute scheduling that pull-based

software, Finite Scheduling can come up with "the optimal scheduling solution" for a given set of parameters, Lischefska said.

This is in contrast with other products, which require that users try a succession of "what-if" scenarios for optimizing work loads, he added. "We also provide the capability for the user to move things around as things change, but no user can figure out how to allocate 4,000 to

WITH THE SAME SCHEDULING engine, you get the same answer; before, answers [that were] gotten on the shop floor conflicted with the high-level answers" generated by MRP.

JOHN LISCHESKA
D&B SOFTWARE

manufacturing requires, Richardson said. "Thus the need for an MRP front end like D&B's finite scheduling product."

Through rule-based algorithms incorporated into the

6,000 open orders across six centers."

The link between finite scheduling and D&B's AMAPS MRP II ensures that short-interval, detailed scheduling for the

shop floor is synchronized with master production scheduling for an entire plant or product division.

"With the same scheduling engine, you get the same answer; before, answers [that were] gotten on the shop floor conflicted with the high-level answers" generated by MRP, Lischefska said.

While the initial package only supports sequential files, it will be hooked to relational database management systems at an unspecified future date, Lischefska said.

AMAPS Finite Scheduling System is based on a product developed by Manufacturing Software, Inc. in Cambridge, Mass. It will be initially offered on Digital Equipment Corp. VAX/VMS systems.

D&B plans to migrate it to IBM-compatible workstations based on Intel Corp. 80386 and 1486 workstations at an undisclosed date. It is priced between \$100,000 and \$300,000, depending on system configuration, and it will be available next month.

OLTP

CONTINUED FROM PAGE 29

"Companies that surpass their competitors in providing better, faster, more responsive information [through OLTP] will gain a first strike advantage," adds Tom Willmott, a principal at the Aberdeen Group in Boston.

This kind of demand for ready access to up-to-the-minute information has helped make OLTP the fastest growing computer market segment, according to Ray Schulte, program director at Stamford, Conn.-based Gartner Group, Inc. Schulte estimates that the OLTP market for hardware and software (not including application software, services or support)

will grow from \$35 billion in 1989 to \$72 billion in 1994.

What's new?

In some ways, OLTP is nothing new. It is an evolution of mainframe CICS, a proprietary transaction manager first implemented by IBM in the 1960s. With 40,000 installed sites today, CICS remains the most used OLTP monitor in the industry.

OLTP, as defined by many industry analysts, is different from the old time-sharing on-line monitor technology. "OLTP implies the existence of a database that is available for on-line access with update and inquiry for remote users," says Omri Serlin at Itom International, a Los Altos, Calif.-based OLTP consulting firm. Serlin

says classic examples of OLTP include the airline reservations systems of the '60s and the on-line banking applications of the '70s and '80s.

OLTP is differentiating itself further from CICS by evolving to smaller platforms and open systems, primarily distributed systems on a Unix platform. In fact, several vendors are betting their lives on the fact that smaller midrange systems will be an increasingly attractive choice for OLTP users in the future.

Digital Equipment Corp., Hewlett-Packard Co., AT&T, Sequent Computer Systems, Inc., Sequoia Systems, Inc., Tandem and Stratus Computer, Inc. all offer midrange OLTP options and will be trying to steal those transactions off of IBM CICS mainframes.

For its part, IBM came out in September with a statement of direction to make CICS available under AIX, its Unix offering. And industry watchers say it is likely that CICS will become available for OS/2 and the Application System/400 platforms. But IBM has yet to announce any dates.

Going down

Hyatt Corp. in Chicago recently joined the ranks of the open and downsized. It replaced its IBM mainframe that performed OLTP with four Unix-based processors from AT&T to operate its on-line customer reservations system, according to Joan Lowell, vice president of telemarketing and reservations services at Hyatt.

"We made the change to an open sys-

EIS

If You're Thinking About It...

A nicety

System availability has always been a major issue in the operation of on-line systems. For most users, ensured continued operation is a matter of degree.

Tandem Computers and Stratus Computer have carved a market niche out of users who demand round-the-clock availability.

Availability at K Mart Corp. is tied closely to the bottom line, so its Stratus systems must operate without interruption. "We move about 50,000 credit authorizations per day through the system, and it has to be up," says David Carlson, senior vice president of information systems at the Troy, Mich., retail company.

But other users, while they are concerned about availability, do not see the need for adding the cost of full fault tolerance. Michael Prince, director of information services at Burlington Coat Factory Warehouse, notes, "We have the luxury of being able to store and forward some transactions."

Vendors are taking advantage of this sliding scale by offering degrees of what Aberdeen Group's Tom Willmott calls "fault resilience."

New microprocessing and disk mirroring technologies have been unveiled that can provide a high level of system reliability without the price of full fault tolerance, Willmott adds.

Fault tolerance is seen by many users as a nice-to-have but not critical capability, Gartner Group's Ray Schulte says. But in a competitive OLTP market, fault tolerance may be an option that differentiates vendors.

Several of the traditional mainframe vendors are now actively addressing the fault-tolerant requirement.

So, if Gartner Group is correct in its prediction that the fault-tolerant systems market is only \$1 billion and not growing significantly, then Tandem and Stratus are likely to find themselves with some heavy competition in a small but crowded niche.

MARY LOU ROBERTS

tems environment so we can have greater on-line connectivity to our properties and receive more reservations electronically from various distributed sources including airlines and travel agents," she says.

Companies such as Hyatt are responding to what Floyd Hale, general manager of the Software Platforms Division of Blue Bell, Pa.-based Unisys Corp., says are the two forces driving OLTP: "First, world-wide business interests dictate that an 8 a.m.-to-5 p.m. business environment is no longer appropriate. Second, there is great focus on decentralization with a requirement for seamless transaction processing in an open environment."

For its part, Unisys is developing standard OLTP applications based on X/Open Co.'s Distributed Transaction Processing model.

Modified Unix

Unix's role as the platform of choice for OLTP is not without its problems, however. Current complaints about Unix's shortcomings include the fact that its file system is not geared to support transaction processing, its networking protocols are not reliable, it can't handle multiple interactive users well, and, above all, it was designed as a general-purpose time-sharing system.

According to Serlin, "Unix is really a poor vehicle for implementing OLTP. It lacks the facilities that are required by any serious database-driven application." He admits, however, that database vendors and terminal handlers have been able to bypass some of Unix's limitations to date.

What Unix does offer is a standard platform, the portability of open systems and, as Serlin notes, "the interchangeability that users want. That's important in an OLTP environment."

Burlington Coat Factory Warehouse is one user that demanded a Unix open systems OLTP platform (AT&T's Tuxedo), says Michael Prince, director of information services at the firm. The company's application, an on-line national distribution system that tracks sales and inventory and manages the flow of data between systems in the network, operates on Sequent computers.

Whatever the weaknesses of Unix, it is clear that it will be a key player in the OLTP drama, judging by the commitment to it by virtually all the OLTP vendors.

"Users are saying, 'That's how we need [Unix OLTP]. Change the rules.' So the vendors are," says analyst John Rymer at Patricia Seybold's Office Computing Group in Boston. ■

Roberts is a free-lance writer and consultant in Glenside, Pa.

Not easily defined

While the definition of on-line transaction processing is debatable, most analysts agree on a few key characteristics:

- Access, inquiry and update of a database that changes business-critical data in real time.
- Diverse, often remote users.
- Fast response times.
- High transaction volumes.
- High levels of system availability, if not fault tolerance.

Networks

CONTINUED FROM PAGE 29

gan shipping its storage servers two years ago is a technology that combines optical and magnetic storage and backup, giving users the illusion of endless disk space. The automated software moves little-used files and data out to magnetic disks, but users can recall the information in less than 15 seconds.

The same software that Epoch has been using on its own platform is now being sold as Renaissance Infinite Storage, ranging in price from \$1,500 to \$15,000. The Infinite Backup software is scheduled to be available in the first quarter of 1991.

The debut of the Renaissance products

signals the storage hardware vendor's first move toward becoming a storage software company. The intent is eventually to run its network management software on any computer platform on the network, company officials said.

Along with the Sun agreement, Epoch announced alliances with Mips Computer Systems, Inc. and Hewlett-Packard Co. to move the client portion of its client/server software onto their platforms in 1991.

"Two years ago, the only real way for us to bring storage management to a heterogeneous environment was to build the platform ourselves," said Ken Holberger, chairman and vice president of business development at Epoch.

Bates noted, "Management of network storage is pretty haphazard, and

managing it centrally would solve a lot of problems for us."

An Epoch-1 server in Washington, D.C., is now "the single point of failure for our whole system," Bates said, explaining that all of the university researchers using the Sun network store both active and inactive files on the Epoch machine. While it has never crashed, he added, "I try to be very conservative. If that machine breaks, they can't get to their data."

Holberger said Epoch's server and storage management software is now positioned as an archive-level repository of storage, providing services through the Network File System protocol.

"With Renaissance, we'll be providing that capability directly to the end users of the service," Holberger said.

EIS II

Think Twice.

It's estimated that more than half of today's Executive Information Systems fail.* So if you're thinking about installing a traditional EIS, think twice.

EIS II is the new generation of Executive Information Systems. It's more than just an electronic "slide show". It's true analysis and issue management. For executives, their staffs, and managers throughout your organization.

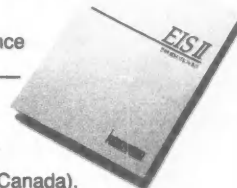
Only Express/EIS® from Information Resources gives you the power of EIS II today. On mainframe, LAN or PC. With full data integrity, end-user flexibility and worldwide support.

If you're thinking about EIS, think EIS II.

Express/EIS Delivers:

- Ease of use for executives, staff and management
- Smooth integration of tracking, analysis and issue response
- Intelligent exception reporting and drill-down
- Dynamic links to corporate data
- Low maintenance costs

For a free EIS II Information Kit, call 617-890-8717 (416-221-2100 in Canada).



information resources

*David W. DeLong, co-author of "Executive Support Systems: The Emergence of Top Management Computer Use."

©1990 Express/EIS is a registered trademark of Information Resources, Inc.

PRODUCT REVIEW

Oracle fields a solid player

Oracle Systems Corp.

This is the sixth in a monthly series of performance benchmarks that for the next several months will focus on the integration of computer-aided software engineering (CASE) and fourth-generation language (4GL) products. The benchmarks are monitored by an independent team headed by David Whiteside, managing director of Computing Futures Ltd. and his associate, Prof. Eberhard Rudolph, formerly of the University of Auckland, for

exclusive publication in Computerworld.

Each product is observed in action over a three-day period during which a vendor team solves the case study project costing system, an application that is familiar to most information systems professionals. The team's mission is to demonstrate the capability of the major CASE/4GL environments to deliver complete and complex business solutions under "live fire" conditions. In this issue, we look at Oracle Systems

Corp.'s Oracle development tool set, which is based on the SQL language.

Carried out by Oracle in Bracknell, England, its team of three people provided a comprehensive and attractive solution to the benchmark and fully earned the rating of "excellent" for the level of completion.

Held back slightly by a Personal System/2 environment that struggled with the application, the team still completed the benchmark and its enhancement in 16 hours and 30 minutes. The overall effort of 40 hours and 45 minutes was one of the best so far. Thus, we rated speed of development "very good."

The most telling element of the benchmark came at the end, when the team had to enhance its solution. They could have gained the top mark but lost time by an unfortunate implementation decision. Still, the speed of maintenance was "very good."

The Documentation also had to be rated "very good." The

CASE tool presented clear entity diagrams and program descriptions. The detailed documentation at the lower levels was well structured and readable. The differences between design and implementation were highlighted, however, they had to be addressed manually.

With a number of different tools, integration is important and requires considerable support. On the positive side, most of the implemented system was directly generated from the CASE environment. However, any low-level changes were not automatically reflected back in the design. At the high level, business rules were entered but were taken as comments only. Finally, two data dictionaries were used for design and production. Under the circumstances, they bordered on "good."

The end-user language SQL*QMX was very powerful and produced excellent results without much effort. While simple file displays were easily handled by the untrained end user, more sophisticated presentations required an understanding of relational logic. Nevertheless, the end-user language had to be

rated "very good."

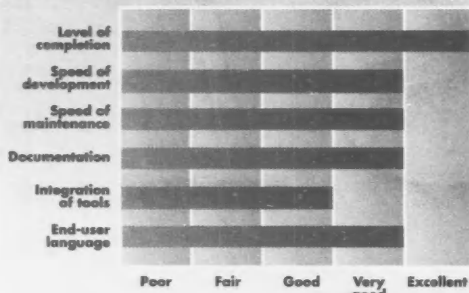
When looking at the marks of this assessment, Oracle's results are consistently very good, lacking any significant weak spots. For the first time in the series, the benchmark was completed well before the end of the third day. While it is a very flexible solution that can be ported to many environments, attention has to be given to avoid being lost in unnecessary complexities.



The Oracle tool kit

- CASE*Designer — CASE tool
- CASE*Dictionary — Design dictionary
- CASE*Generator — Data definition and program generator
- SQL*Forms — On-line application development tool
- SQL*Report — Report and batch application development tool
- SQL*QMX — End-user 'query-by-example' language
- Oracle — Relational database
- SQL*Loader — Conversion tool

Consultant's assessment



Development and maintenance report card

ANALYSIS AND DESIGN: C

Sound foundations were set for the database structure and program architecture. Running on OS/2, the CASE*Designer is unidirectional but can pinpoint differences between designed and implemented data structures.

Strength: It generates data structure and program logic.

Weakness: Business analysis is not integrated.

DATABASE SETUP: B

This stage was fully automated. However, the database initially generated contained only the basic data structure with most editing rules left to be implemented at the program level.

Strength: Automatic and very fast.

Weakness: A secondary data dictionary had to be generated.

FILE MAINTENANCE

TRANSACTIONS: B

Very efficient screen user interface with an automatic inquiry facility on every field. Single-file logic required little effort. Yet much time was needed when multiple files had to be maintained by a single transaction.

Strength: It has powerful screen painting.

Weakness: The going gets harder in multiple file logic.

COMPLEX TRANSACTIONS: A

Despite the elaborate screen layout, most of this transaction could be automatically generated, which contributed to the fast implementation time. The presentation was nicely laid out but numeric data had to be entered left justified.

Strength: Generated transactions can be easily refined.

Weakness: No support for

time data handling.

INQUIRIES: A

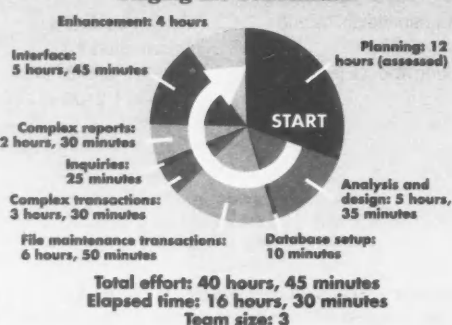
The 'query-by-example' style tool was very efficient. The task was completed in good time and very well presented. Providing access to the data dictionary, the programmer simply selected the necessary fields to answer the two inquiries.

Strength: It is very fast.

Weakness: Presentation is somewhat rigid.

COMPLEX REPORTS: B

Staging the benchmark



Although the results were obtained quickly, the implementation required tedious detail work when defining the report layout. Some minor rounding errors occurred because of substandard time handling.

Strength: It is a flexible reporting tool.

Weakness: It has no report painter.

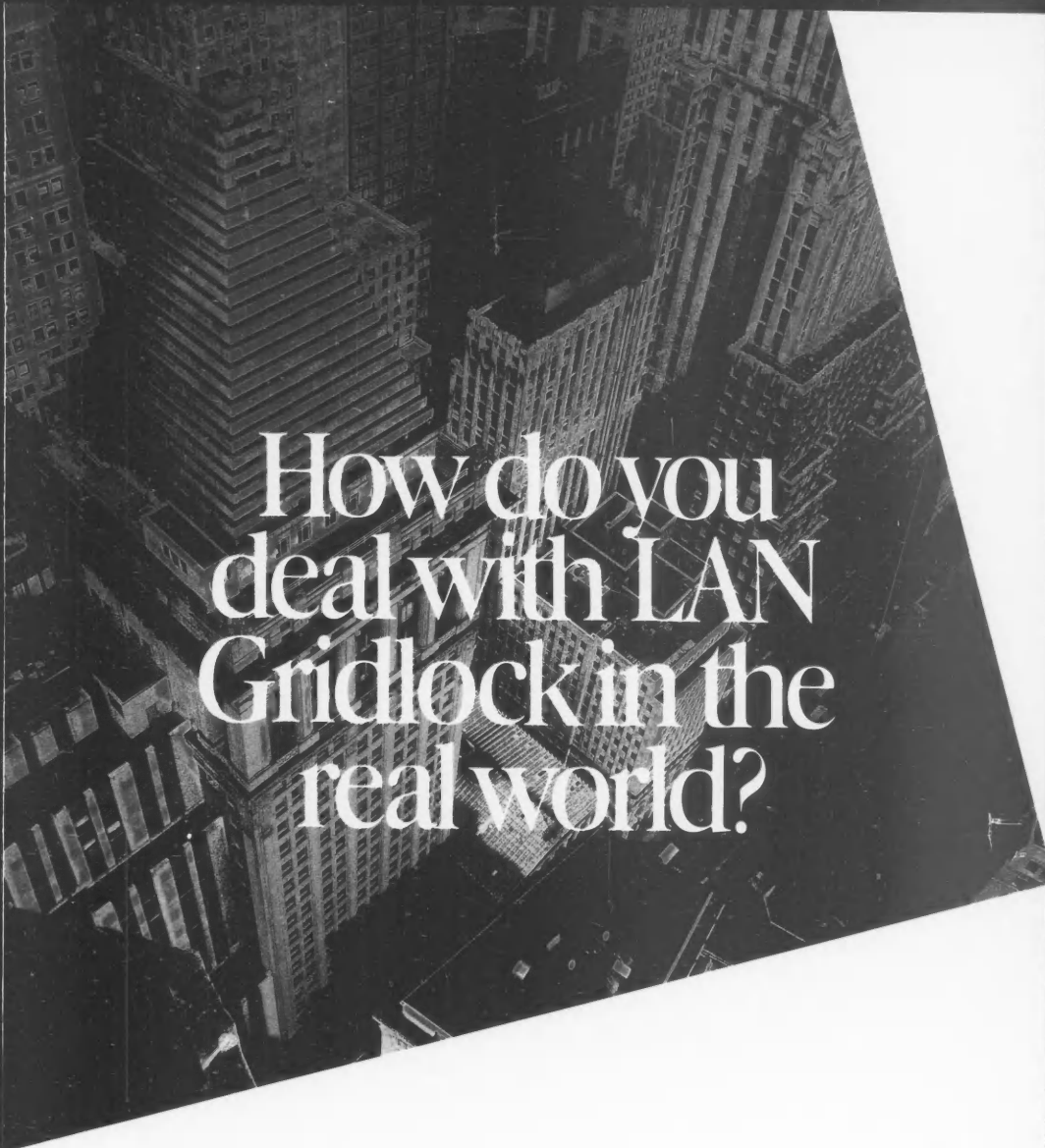
INTERFACE: B

The Ashton-Tate Corp. Dbase file was converted into an Oracle database using the DB3PREP function of SQL*Loader. This part of the interface was easily accomplished, but the batch editing process that followed took longer than expected to develop.

The solution was initially developed on a PS/2 IBM Token-Ring network with three stations dedicated to the development team. The completed Oracle solution was then transferred and tested on an IBM 4381 mainframe under MVS/XA.

Details of the product can be obtained from Oracle World Headquarters, 500 Oracle Pkwy., Redwood Shores, Calif. 94065, (415) 506-7000.

Development World product briefings are based on a series of full solutions to the case study. They are prepared by leading vendors and published along with in-depth product analyses and consultants' test reports in Development World Libraries. Please see business reply card between pages 76 and 77 or fax (508) 820-0146 for a brochure.

An aerial, black and white photograph of a dense urban landscape, likely New York City, showing numerous skyscrapers and buildings packed closely together. The image is tilted slightly to the right. The text is overlaid on the lower-left portion of this image.

How do you
deal with LAN
Gridlock in the
real world?



Switched Multi-megabit Data Service (SMDS) is a Service Mark of Bell Communications Research.

Real-World Bandwidth.

LAN networking and LAN gridlock. With today's data explosion, the two pretty much go hand in hand.

That's the real world. But your local phone company will be able to offer high-bandwidth networks that unblock the

Switched Multi-megabit Data Service

gridlock. AT&T's BNS-2000 Broadband Networking Family will provide the first Switched Multi-megabit Data Service (SMDS)SM on the public network. A bandwidth-on-demand switch, the BNS-2000 will operate at speeds of between 1.5 and 155 Mbps. Giving you access to bandwidth that can interconnect LANs across entire cities. Bandwidth that can provide high-performance, connectionless data services like SMDS and Metropolitan Area Networking (MAN).

Increasing productivity. Taking you one step closer to the broadband ISDN applications you want.

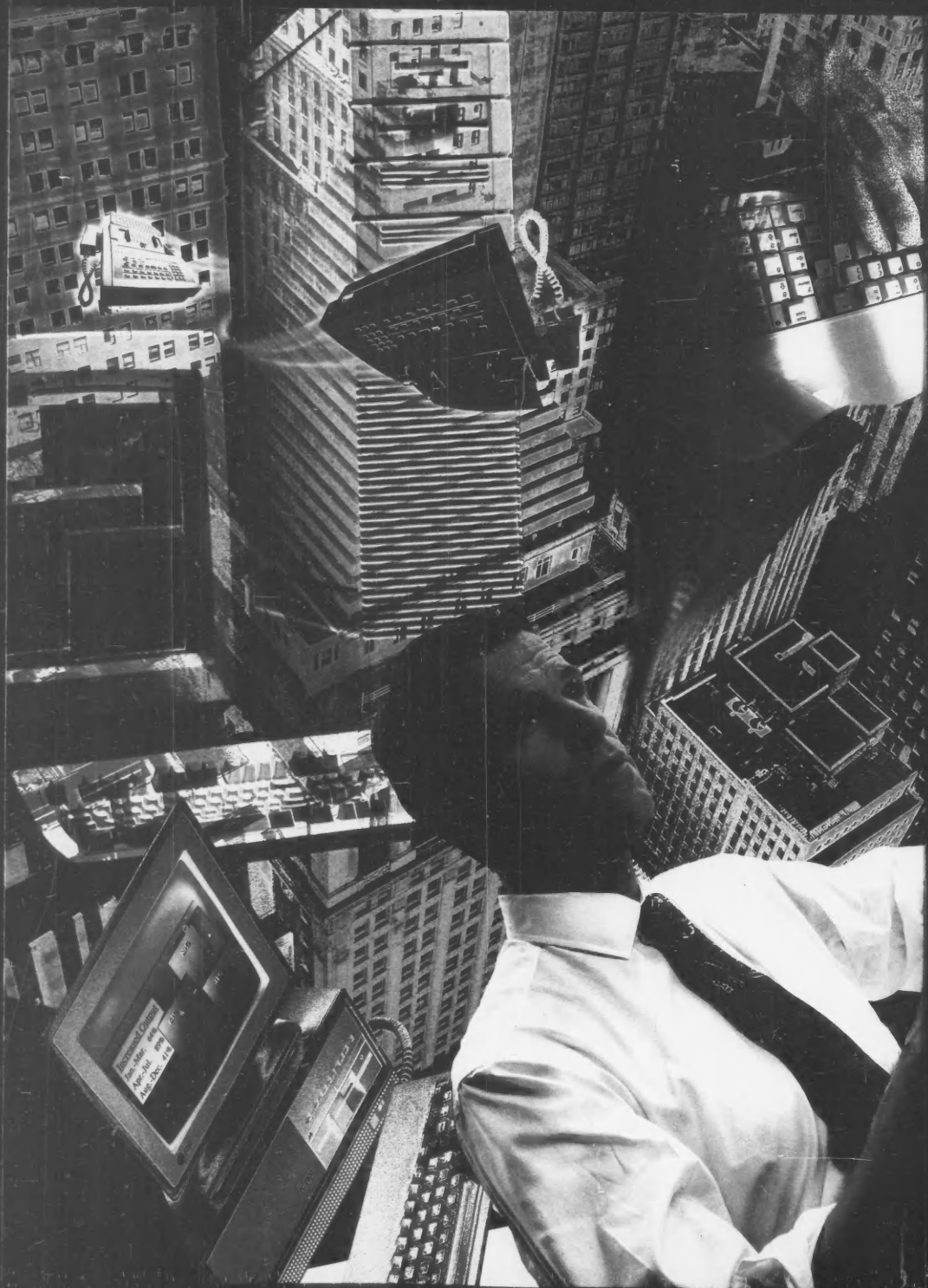
Without major investments in hardware or disruptions to your private network. BNS-2000.

Successfully being trialed by several local telephone companies, it will provide bandwidth you can count on. Bandwidth that truly unblocks LAN gridlock.



AT&T

Network Systems





Real-World Networking.

Data networking without networking headaches. Not too familiar in the real world, is it? Not when your service needs exceed what your existing equipment can provide. But your local phone company is changing that, by using a family of

AT&T access products that will create flexible bandwidth-on-demand data networks.

Providing the dedicated services you want, when you want, in

Bandwidth on Demand

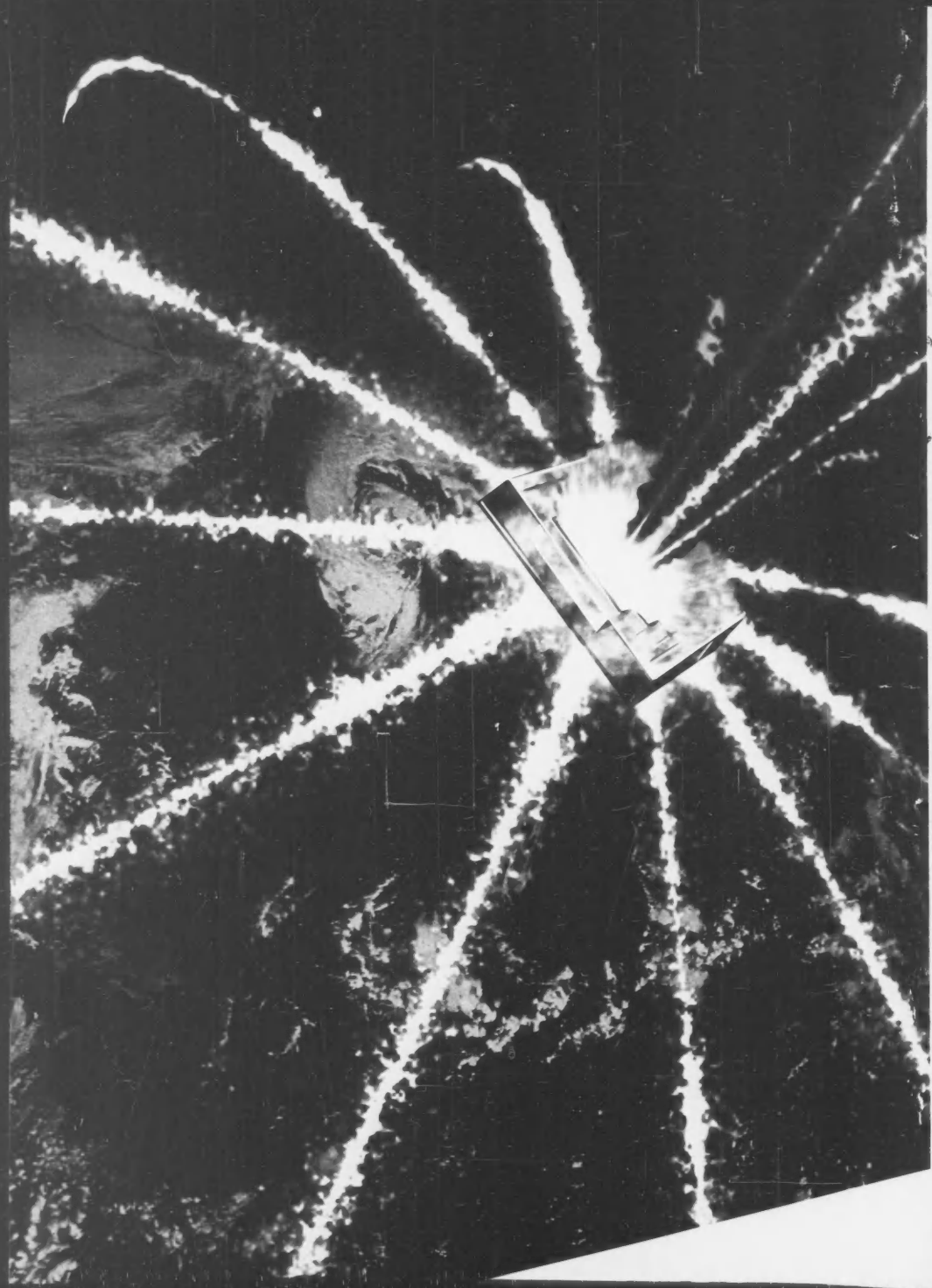
whatever "mix" you want them. Like the SLC®-2000 Access System, a SONET-based digital loop carrier system that will help your local phone company offer you full service at greater bandwidth. Whenever you need it. And the

BRT-2000 Access Node. Located right on your premises, it puts DS1 and DS3 multi-megabit services and fiber capacity at your doorstep. Today. And the DDM-Plus, bringing fiber-based, high-capacity services right to your desktop. All giving you access to reliable, robust services that will move you smoothly into the future. And all available through your local phone company. SLC-2000 Access System. BRT-2000. DDM-Plus. Networking solutions that give you just what you want. Now that's data networking in the real world. Without networking headaches.

Switched Multi-megabit Data Service (SMDS) is a
Service Mark of Bell Communications Research.



AT&T
Network Systems





Real-World Vision.

In an ideal world, information could be sent and received anywhere, anytime; in any form of voice, data, and image. AT&T is committed to helping make all this a reality for you. Today. In the real world. How? Through a vision called Universal Information Services. And Service Net-2000, the architecture it's built on. An architecture for the public network that creates a "services-ready" infrastructure. Provisioning services instantly. On

Service Net-2000

demand. An architecture that answers your bandwidth needs with a growing set of ISDN, SONET, and broadband services. That raises the levels of network intelligence to provide the security and reliability you're looking for. That lets the public network act as a perfect partner to your existing private network. That will gracefully incorporate the latest technologies from AT&T Bell Laboratories. Service Net-2000. Your local phone company. Working with, and for you, to make the UIS vision part of the real world.



AT&T
Network Systems

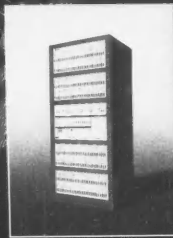
Unblock LAN Gridlock.



BRT-2000
Access Node



BNS-2000
Broadband Networking
Family



SLC-2000
Access System

Call AT&T at 1 800 638-7978, ext. 2010.



AT&T
Network Systems

PCs & WORKSTATIONS

COMMENTARY

Richard Pastore

Upgradable imprint



When IBM introduced its high-end Personal System/2 late last month, it put the ultimate endorsement on the concept of personal computer CPU upgradability. By joining the first proponents of this technology, IBM has served notice to the industry that this is truly the way to go for high-end PCs.

The ability to swap processors in Intel-based PCs was first promoted by so-called second-tier vendors in the mid-1980s. AST Research, Advanced Logic Research and some others have offered 80286-based boxes that users could boost to an 80386 or even an i486.

Many analysts thought of these upgradable designs merely as mildly interesting gimmicks. Vendors who didn't offer it ridiculed the concept as technologically inefficient.

Users have also been cool to upgradable boxes. One reason has been that businesses preferred to hand down old 286 machines to neophyte users and buy powerful units for their hot-shots. Others opted to buy more powerful PCs than necessary and "grow" into them.

But the tightening economy and the approaching saturation

Continued on page 44

A plethora of high-end server choices

ANALYSIS

BY RICHARD PASTORE
CW STAFF

The recent rash of rollouts in the high-end personal computer server arena may have many users reeling over the diverse assortment of brands, designs and capabilities. More than ever, trying to sort one from another means understanding your network's needs and matching them to the server's capabilities, observers said.

Applications and the number of users are the first considerations for most shops planning a purchase.

"If you're talking about a small work group with a high degree of emphasis on electronic mail, you'll want something configured as a communications server," said Tom Willmott, vice president at Boston consulting firm Aberdeen Group.

For file and communications servers, lower-end Intel Corp. 80386- or 80386SX-based systems are generally adequate, analysts said. Many users agreed, saying they are content with these low-end configurations.

"Last year, we considered a [reduced instruction set computing] machine, but we didn't think

we needed that much horsepower," said John Carroll, vice president of MIS at Cumberland Farms, Inc. IBM 386-based Personal System/2 Model 80s "have done a fine job for us to this point," he said.

On the other hand, if the network must serve multiple departments, then 32-bit I/O machines with upgradable processors should be considered, said Frank Dzubeck, president of Communications Network Architects in Washington, D.C. The same recommendation holds for servers that must perform compound functions — act as a gateway to outside services as well as a file or database server, Dzubeck noted.



Deloitte
Touche's Rankin

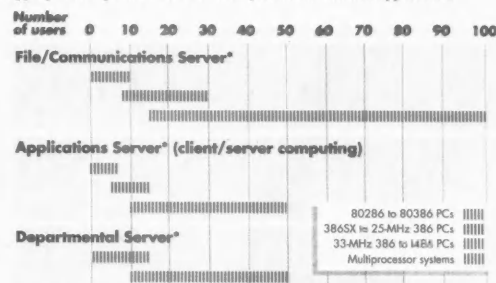
Once they have established a need for high-end servers, users come face to face with a barrage of platform choices. "During the last 12 months, you've had a filling out of the marketplace," Dzubeck said.

Many vendors are jostling for sales potential. Demand for high-end PC servers will increase by 40% per year through 1993, said Workgroup Technologies, Inc. in Hampton, N.H.

When sorting out this crowd of vendors and machines, users say their key considerations are I/O, systems flexibility, technical design, brand name and price.

But which server?

PC servers span a broad power range and determining which is appropriate depends on the number of users and desired application



*Based on Compaq system designs

Source: Compaq Computer Corp.

CW Chart: Doreen St. John

Accounting firm Deloitte Touche, happy for now with 386-based servers, is studying IBM's new i486-based PS/2 for future possibilities. For the large data sets moving across Deloitte's networks, throughput is the key to platform choice.

"We're looking to get data to and from the file server by the fastest possible means," said Claude Rankin, MIS manager at the New York office.

Flexibility key

Other users say flexibility is the key to their buying decisions. Mike Purcell, manager of technical planning at Baxter Healthcare Corp., said he chose a Compaq Computer, Inc. Systempro because of the ability to add users "fairly smoothly without running into a wall."

"I needed a system where I could always grow," said Louis Arena, systems officer at Citibank NA in Plainview, N.Y.

Arena acquired a dedicated PC server from Netframe Sys-

tems, Inc. to replace 286-based machines. "A regular 386 or 486 server wouldn't have given us that advantage," he said.

Many users view such upgradability as investment protection — a prime consideration with system prices starting at \$15,000 and running up to \$70,000 or more.

Cox Cable, Inc. in San Diego recently added a second 420M-byte hard disk to its Systempro. "I didn't lose any of my existing investment," systems analyst Mark Olsen said.

The enormity of the hardware investment and the critical role of the server pushes brand-name reliability above price on many users' criteria lists.

"Our experience with Compaq and IBM have shown they have viable, attractive products," said Michael Ball, data processing coordinator at the Federal Reserve Bank in Baltimore. "We know we could save money by looking elsewhere, but we don't feel the need to."

CICS OS/2 Programming Is Now as Easy as:

>A: SETUP

MICRO FOCUS®
A Better Way of Programming™

You can now get IBM CICS OS/2 as an optional add-on to the Micro Focus COBOL/2 Workbench™!

Here is what's included in the CICS OS/2 Option:

- IBM CICS OS/2 on Diskette Media
- SETUP Procedure
- BMS Screen Development Facility
- Integrated Preprocessor
- Online Help

♦ CICS programmers can now get Micro Focus COBOL/2 Workbench and the powerful inter-systems communications of IBM CICS OS/2 to create and test new "cooperative processing" applications. You can process CICS transactions on local workstations and access databases on a CICS host or on networked CICS OS/2 systems.

♦ The Micro Focus SETUP procedure installs the CICS OS/2 Option in your programming workstation within 30 minutes! This makes CICS OS/2 accessible from the Micro Focus menu system. There is no need to do an initial install on the host.

♦ The integrated preprocessor in the CICS OS/2 Option allows programmers to debug at the EXEC level and view original source code instead of expanded precompiled code.

♦ The BMS screen development facility can design and paint CICS transaction screens or import BMS mapsheets.

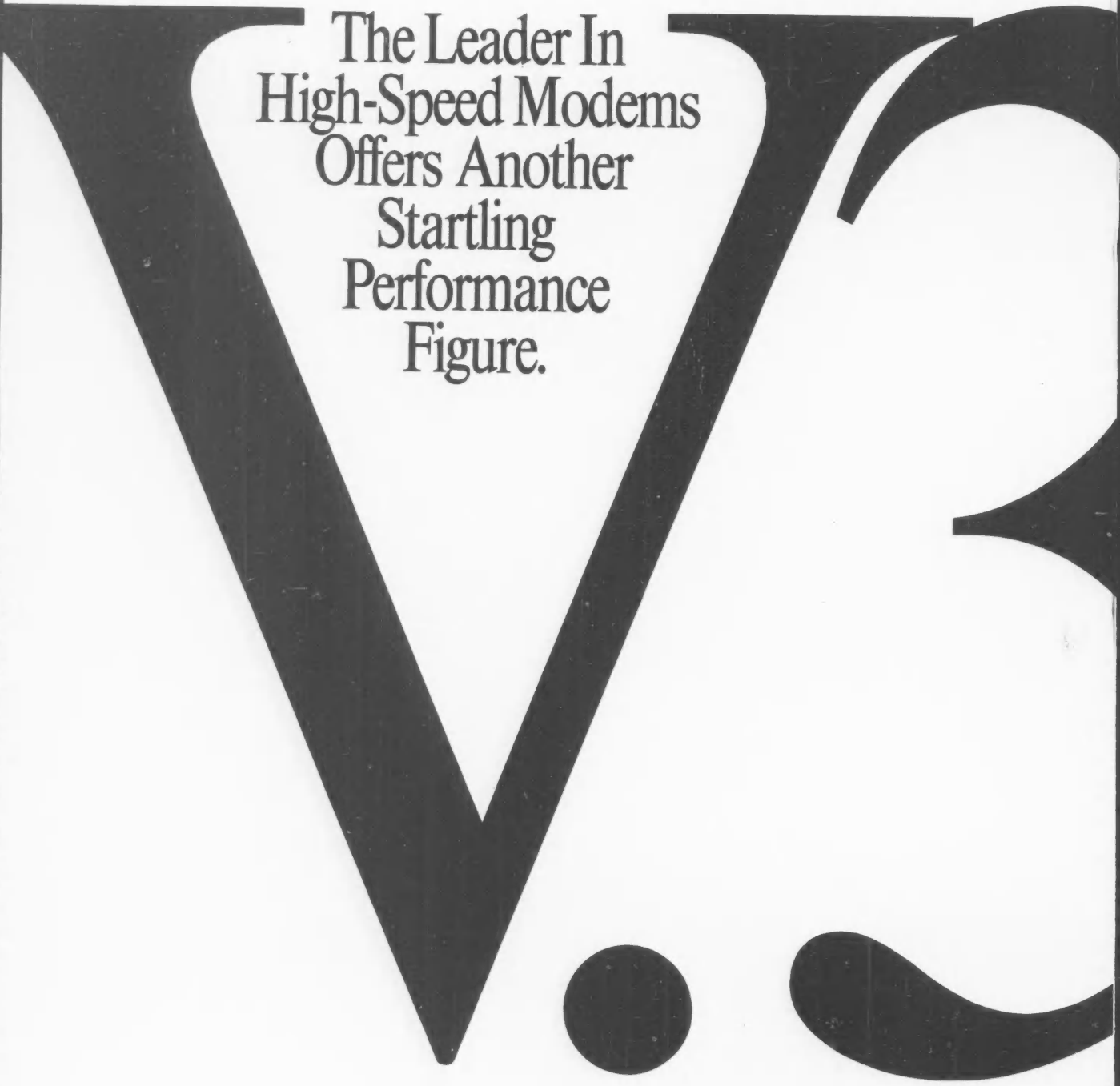
♦ Micro Focus Advanced ANIMATOR™ lets CICS programmers create program structure charts, monitor multiple data variables, analyze source code execution, or alter the flow of control. Workbench has all the tools you'll want for debugging and testing sophisticated online transaction applications.

♦ IBM CICS OS/2 lets your workstation based CICS applications talk to mainframe data files and databases transparently. Build and test these applications with the CICS OS/2 Option and take full advantage of the transaction routing and function shipping features to reduce host and network loads.


Let your applications reside where your business needs them!
Develop and test cooperative processing applications with the CICS OS/2 Option for Micro Focus COBOL/2 Workbench.

For more information about the CICS OS/2 Option call Micro Focus today at 1-800-872-6265 or 415-856-4161.

IBM and CICS OS/2 are trademarks of International Business Machines Corporation.



The Leader In
High-Speed Modems
Offers Another
Startling
Performance
Figure.



The best choice in high-speed, dial-up modems is now the best choice in V.32 modems.

Telebit has become the leading supplier of high-speed dial-up modems by delivering faster, more robust and reliable performance in mission-critical applications.

In fact, we created the market in 1985 with the TrailBlazer®.

Now we've put the same advanced technology and U.S.-built quality into a family of V.32 modems that sets a whole new standard of performance for CCITT-standard products.

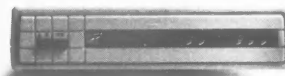
Our T2500 was the first V.32 modem to deliver the full implementation of V.42 error-correction and V.42bis high-performance data compression capabilities. The T2500 supports all industry standards, as well as our patented multicarrier Packetized Ensemble Protocol® (PEP) technology.

Unlike competitive modems that hang up when line quality drops, PEP allows the T2500 to keep transmitting. Giving you real-world throughput that outclasses anything in its class.

You might think you'd pay a premium for this kind of performance, but actually our entire family of high-speed modems is very competitively priced, from \$745 to \$1495 (quantity one list price).

Call 1-800-TELEBIT today for more information on our V.32 modems. And the name of your nearest distributor.

Telebit. The highest quality, not the highest price.



Free Lotus® 1-2-3® from NEC.



WINDOWS™ SHOPPING? LOOK NO FURTHER! NEC is including the new Lotus® 1-2-3® Release 3.1 and Windows™

© 1990 NEC Technologies, Inc.

Some restrictions may apply.

3.0 at no additional charge with every PowerMate® SX, 386 and 486 system purchased. **WHAT YOU SEE IS**

PowerMate is a registered trademark of NEC Corp.

Mouse and monitor must be purchased separately.

WHAT YOU GET. The graphical interface that can "stack" work sheets in multicolor, giving the user simulta-

386 & 486 are registered trademarks of Intel Corp.

neous access to 16MB of memory. All with the fingertip ease of icons, menus, display boxes and a mouse!

Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.



LET YOUR FINGERS DO THE SHOPPING. Call 1-800-NEC-INFO for the authorized NEC dealer nearest you. Your win-

Windows is a trademark of Microsoft Corporation.

dow of opportunity will close on December 31st. Act today or your \$745.00 value will be out the you-know-what.

DELIVERY INFORMATION:

SUBMIT COUPON FOR YOUR COMPLIMENTARY COPY OF LOTUS® 1-2-3® RELEASE 3.1; WINDOWS 3.0 IS INCLUDED AT POINT OF PURCHASE WITH EACH POWERMATE.

Your Name: _____

Telephone: (_____) _____

Company: _____

Delivery Address: _____
Street City / State / Zip

Your Signature: _____

Check one only ☐ 5.25" (1.2MB) ☐ 3.5" (720KB)

Please include with this coupon your original receipt of purchase identifying the authorized dealer's name, the system purchased, the serial numbers of the equipment and the dealer's validating signature.

To rush your order, fax sales invoice with this coupon to 1-508-264-8622.

Your Federal Express Billing Number: _____

Please note: We cannot ship to a P.O. Box.

This offer is valid only in the United States and Canada and is void where prohibited. Availability is subject to verification of point of sale information. This offer is valid only for PowerMate SX, 386 and 486 systems purchased between October 1, 1990 and December 31, 1990 while supplies last.

Send with sales invoice to: NEC Technologies, Inc., 1414 Massachusetts Ave., Boxborough, Massachusetts 01719, ATTN: 1-2-Free! Promotion Coordinator, Dept. 603030. Orders will be shipped within 24 hours of receipt of coupon and sales slip at NEC Technologies. Valid coupons must be postmarked by January 1, 1991. NEC is not responsible for lost or misdirected mail and reserves the right to reject any coupon which is incorrect, and may cancel this promotion at any time.

A laptop sinks to new depths

Researchers dive with Compaq device to watch stingrays' mating rituals

ON SITE

BY PATRICIA KEEFE
CW STAFF

In the shallows of the Gulf of California last spring, neurobiologist and researcher Timothy Tricas spent 10 days diving with a waterproofed laptop used to track part of the ordinarily secretive stingray's mating ritual.

Tricas, who is a research associate at Washington University's School of Medicine in St. Louis, and Scott Michael, a student at the University of Nebraska, wanted to test whether the bioelectric field produced by stingrays is sufficient to attract potential mates. "Would male stingrays dig up the females using electrosensitivity to find mates?" Tricas asked.

While British Broadcasting Corp. and *National Geographic* cameras rolled, Tricas and Michael put a customized Compaq Computer Corp. SLT 286

through its paces in a remote bay off the coast of Sonora, Mexico.

Shielded in a fortress of Plexiglas and weighted down with 40 pounds of ballast, the laptop was used underwater to play back digitized waveforms through electrodes buried in the sand. (Females attempting to avoid mating-minded males often bury themselves on the ocean bottom.)

The waveforms were collected and digitized from stingrays back at the lab and then synthesized for playback. Tricas used the laptop to adjust waveform frequency and amplitude.

The experiment's success resulted in male stingrays zeroing in on the buried electrodes from many feet away, displaying the first phase of courtship. Some were so fooled that they attempted to dig up nonreceptive females, drawing slaps for their trouble.

The project has resulted in the first look at the sensory neu-

robiology of an electrosensory receptive system as it relates to the biology of a natural population of elasmobranchs.

Tricas spent three to four months building his system from the ground up with donated equipment. "I looked at every laptop that exists, but only one — Compaq's — could accommo-



Compaq's SLT 286 collected bioelectric field data from stingrays

date 16-bit external data acquisition and digital-to-analog cards in a portable mode," he said.

He selected the 14-pound SLT 286 because it was fast, held an internal coprocessor and offered access to the motherboard bus. "This is important [in order] to bring these peripheral boards in contact with the system. Most laptops have proprietary buses," he said.

Tricas wrote the application driving the project in the DOS-based Asyst high-level language, in part because it supported the data acquisition and playback cards he purchased from Metrabyte in Taunton, Mass. Keithley Instruments, Inc. also supplied Tricas with the electronic equipment he needed to make preliminary measurements of stingrays' electrical fields.

"Asyst allows you to get hands-on with the data acquisition to manipulate files for analysis and output," Tricas said. "We had superb technical support.

This project would have been impossible without conversations with Compaq's engineers and

isolation amplifiers from Analog Devices, [Inc.]," Tricas said, explaining that he had to go into the bowels of the computer and insert a specialized attachment to support the full-size cards. Some vendors will not allow users to root around inside their hardware. Apple Computer, Inc., for example, used to seal its Macintoshes.

"[Compaq's engineers] had concerns, but they were totally supportive," he said.

Tricas compared the housing wrapped around the laptop to that used to protect underwater cameras. A chunk was cut out of the Plexiglas to make room for a membrane that protects the keyboard yet still ensures typeability.

"You can do anything at 100 feet that you can do in an office, but obviously a lot slower," Tricas said.

The internal battery was supplemented with a 10-A, 12-V external battery pack attached to the laptop via an underwater cable.

How well did the system work? "I'm the first man to play Pac-Man underwater at 30 feet," Tricas quipped.

COMDEX NOTEBOOK

Depressed because you missed Microsoft Corp. honcho Bill Gates' keynote at Comdex? Well, fret not! Microsoft is already a step ahead of you, assuming you've got 10 bucks to spare and four to six weeks to wait. Last week, Microsoft ran a large ad with headline-size type offering a choice of a free white paper on Bill's speech, "Information at Your Fingertips," or, for a measly \$10, a 45-minute VHS video of Gates' flashy (and mega-expensive) presentation. How thoughtful. We have one quibble, however: In tiny type, the ad says, "Offer good only in the 50 United States." We thought there was only one United States, but perhaps cloning has reached new heights.

Asymetrix Corp. unwrapped a version of its Toolbook for OS/2. Toolbook is used to build graphical applications without traditional programming languages. "The OS/2 development environment is much more complex. Us-

ers are developing more sophisticated applications, and there aren't many off-the-shelf packages," President Paul Allen said. By empowering users to develop their own applications more easily, Toolbook allows them to become productive under OS/2 much faster, he claimed.

The recently formed Multiuser DOS Federation unveiled its viewpoint on standards, which focused on application programming interfaces that control record-locking, access to files and communications ports, intertask communications and operating systems identification. The aim is to identify existing standards that simplify the interconnection and use of multiuser DOS components. The 20-member group also distributed "Understanding Multiuser DOS."

Over at the Wordperfect Corp. booth, attendees received both cowboy

hats and the news that Wordperfect for Windows and a major upgrade to Wordperfect for the Macintosh will ship in the first quarter. On a less urgent note, the company also announced that Wordperfect for Next is slated to ship before the end of this year.

Comdex/Fall '90 was reportedly the largest trade show ever in the U.S. More than 120,000 crammed into the five-day show. The total acreage of the show floor was as great as 40 football fields. There were more than 22 miles of aisles. If all the copies of the show programs were piled atop one another, they would rise 1½ miles high. More than 1,800 reporters from around the world covered the event.

You know things are getting slow when a vendor puts out a press release hyping the fact that its edge over the competition is a hologram of its computer on the show guide cover — not the computer itself. Everex Corp. is so taken with the hologram of its latest computer (sorry, no model number was in-

cluded in the release) that the company plans to incorporate the hologram into "commemorative" key chains, buttons and paperweights. Must have been a slow day in corporate P.R.

At least one vendor tried to bring the Green Revolution to Comdex. Magee Enterprises, Inc., which "likes to consider ourselves the company with an environmental conscience," sent out party invites packed with little green facts. For example, "In the time it takes to read this invitation, more than 20,000 trees will fall in the world's rain forests. Within the next minute alone, another 50 acres will be destroyed. Forever. Think about it." Invitees were invited to kick in ideas on improving the environment. Meanwhile, Magee ticked off its contributions: paper, glass, plastic and aluminum recycling; the elimination of plastic trays; swapping Tyvek sleeves to paper; and, in some cases, eliminating outer packaging altogether.

Compiled by Patricia Keefe, James Daly and Michael Fitzgerald.

DB2 ON YOUR PC

Develop full scale DB2 applications on your PC! Join the thousands of DB2 developers already benefiting from the productivity gains provided by the XDB-Workbench for DB2.

XDB puts a 100% DB2 compatible SQL DBMS and COBOL precompiler in your PC—seamlessly integrated with Micro Focus COBOL 2 Workbench and its CICS option for interactive development.

Multi-user development can be supported by the XDB-SQL Database Server in MS-DOS, UNIX, OS 2, and Netware 386 environments.

"The only tool available that adheres closely enough to IBM's DB2 to allow applications developed on the PC to be migrated to the mainframe with little or no modification."

"Develop on PCs... then run the finished software without changes against DB2 data on mainframes thanks to XDB's DB2-compatible database server software."

PC Week
June 12, 1989

DBMS
January 1990

Interested in DB2 power on a PC?

Call (301) 779-6030

XDB Systems, Inc.
7309 Baltimore Avenue
College Park, MD 20740
FAX: (301) 779-2429



© 1990 XDB Systems, Inc. XDB is a registered trademark of XDB Systems, Inc. DB2 is a trademark of IBM. Other product names are trademarks of their respective holders.

Older technology: Good to last drop

BY JAMES DALY
CW STAFF

Populist heroes seem as rare as hen's teeth these days, and the computer industry is no exception. Customers frequently complain that many company leaders seem willing to provide only the latest and greatest widgets for leading-edge users and never go to bat for those trying to squeeze the last drop of functionality out of older technologies.

That may soon be changing. If the reception he received at a Comdex/Fall '90 panel discussion exploring the battle over graphical standards is any indication, Geoworks Chief Executive Officer Brian Dougherty could soon lay claim to the position of the personal computer industry's voice of the common man—or at least the voice of anyone who has a shop full of older PCs and workstations.

Dougherty's Berkeley, Calif.-based firm is in the final stages of putting out Ensemble, a graphical user interface that requires only a fraction of the system resources of Microsoft Corp.'s Windows 3.0 operating environment, runs on IBM Personal Computer XT-class systems and offers the Open Software Foundation's Motif user interface. While Ensemble still has a way to go before a full suite of applications is available, if it is all it's cracked up to be, it could emerge as the savior of millions of DOS users who crave the point-and-click simplicity of Windows but feel cut out by the environment's ravenous system requirements.

Early Windows 3.0 users complained that it must be used with at least an Intel Corp. 80386-based PC and about 4M bytes of random-access memory, or it's a waste of time.

Runs on anything

Ensemble is designed to run on anything from the now-ancient IBM PCs and XTs to leading-edge I486-based workstations. Ensemble requires only 512K bytes of RAM, a hard disk, a mouse and a graphics display, and it will run on 8088- or 8086-based systems. It will be priced at \$200 and is scheduled to ship early next month.

Geoworks trimmed the system requirements through efficient coding techniques, said Vice President of Marketing Lee Levano. The firm also employed programmers who crafted Ensemble in assembly language, which requires less RAM and disk capacity, Levano said.

Microsoft officials, meanwhile, have maintained that Windows was specifically designed to be a next-generation product, and they have warned users to stay abreast of new developments or be prepared to suffer the consequences.

Some analysts said this logic is flawed. "Corporate buyers can't be happy that Windows won't run on any of the PCs they've purchased over the past five years," said Jeff Tarter, editor and publisher of "Softletter," an industry newsletter.

With the economy slowing

down, Dougherty said, it is also increasingly unlikely that users will have the spare cash for expensive upgrades. "You don't want to give every clerk in your office a 386-based PC with 6M bytes of memory," he said. "But you do want to give them a graphical environment that

makes their job easier."

Is Ensemble too good to be true? In some ways, yes. Like Tandy Corp.'s Deskmate user interface, developers must write specifically for Ensemble to take advantage of its features.

Meanwhile, users must satisfy themselves with the applications that are bundled with Ensemble. These include a word processing program, a file man-

ager and some rudimentary communications and drawing programs. There is no spreadsheet program available yet.

However, analysts said, when and if those deficiencies are eradicated, Ensemble could become a serious player. "This isn't just a beauty contest," Tarter added. "Ensemble has long-term potential in the graphical environment."

There Of Good Reasons These Are

ProAudit

ProOptimize

ProSecure

ProUtility

Autodesk heeds end users' suggestions

BY CAROL HILDEBRAND
CW STAFF

When Autodesk, Inc. started to work on the latest upgrade to Autocad, its popular computer-aided design (CAD) software package, the company did something many firms only pay lip ser-

vice to: It listened to its users.

"They're changing, which is great," said Vijay Parikh, a systems engineer at Compaq Computer Corp. in Houston. "They didn't listen to their users [before], and now they do, and that's a big improvement."

Autocad, which dominates

the market with an installed base of 400,000, has several important enhancements in Release 11. Users in particular cited Paper Space, enhanced network support, reference files and text editors, as well as the speed achievable with the new release.

"We expect Release 11 to be

the most significant upgrade since Autocad was first introduced," said Malcolm Davies, an Autodesk senior vice president.

Bob Callori, CAD manager at Hornberger & Worstell, Inc., an architectural firm in San Francisco and a Release 11 beta-test user, agreed. "It is [the most significant upgrade], more because of its speed than anything else. It's more like a blink of the eye as

opposed to watching that hard drive blink."

Parikh was particularly impressed with the networking support available in Release 11, which he said will save on the time necessary to upgrade Compaq's 350 users and lost data.

"Until now, it was the end user's responsibility to back up all the drawings," he said. "Now it's tension-free, because it becomes the network administrator's responsibility, and whatever he does, he's always 100% sure that the drawings will be backed up every night."

The text editor was another feature that flowed from user discontent. "We've been asking for a text editor for years," Callori said. "Now I can get rid of some of the [third-party software] on my hard drive," he added, "and start using the things that should have been part of the program from Day 1."

THEY DIDN'T listen to their users [before], and now they do."

VIJAY PARIKH
COMPAQ

Other features cited by users included reference files and a function called Paper Space. According to a beta-test user in a manufacturing company who asked not to be named, Autocad previously allowed only plotting, or printing of hard copies, of one view of a component at a time. With Paper Space, "you can put more than one view on one hard copy," the user said. Paper Space also allows a user to resize and reconfigure the different views, as well as plot them with a single command.

Parikh was also impressed by the annotation abilities available in Paper Space. "If you have a 3-D model, you don't want to write anything on top of your model in your design file. But when you actually plot it, you want to annotate that or put some text on it. That can be done now through Paper Space," he said, adding that it was also useful for adding comments on drawings, which is rather like writing in the margins of a manuscript.

Parikh also praised the reference file function. He compared it with overlaying a drawing done on transparent paper onto the design in progress. So, for example, "you can reference a plumbing drawing and then make the electrical layout without having the plumbing objects in your drawing," he said.

Autocad Release 11 is priced at \$3,500, according to the vendor. Release 10 users can upgrade for \$500, and upgrade costs for Release 10 for 386 users is \$200.

We Are Hundreds Of Users Who Chose Us To Support DB2. Our Latest Four.

With the addition of these four new products to our ProSeries for DB2™ product line, On-Line Software solidifies its position as an industry leader in supplying solutions and support for DB2.

For the Database Administrator, we offer *ProAlter*Plus*—for DB2 catalog analysis and object maintenance; and *ProBuild**—to create customized DB2 tools and prototypes 50% faster. These are now joined by *ProSecure**—the leader for managing DB2 security; *ProAudit**—the custom audit trail facility for DB2; and *ProUtility**—for automated scheduling and administration of DB2 utilities. All these will help you meet deadlines and simplify the complexities of DB2.

For the Application Programmer, we have *ProEdit**—the industry leader for complete DB2 application testing. This is now complemented by *ProOptimize**—which provides automated recommendations for efficient DB2 application tuning. These speed applications into production, improve DB2 application performance, while saving you time.

On-Line Software's newly expanded ProSeries for DB2, coupled with its full range of DB2 courses, and complete technical and management DB2 consulting services, will help the DBA and Application Programmer increase their speed, quality and effectiveness, and give your company a competitive edge.

Naturally, On-Line Software offers over twenty years of leadership in IBM® systems software and a lifetime trade-in guarantee.

As you can see, our commitment to DB2 solutions and support goes beyond a lot of talk.

For more information, please call 800-642-0177. In Canada, call 416-620-4844. Outside the U.S. and Canada, call 44-71-631-3696.

On-Line Software
INTERNATIONAL

ProEdit and ProAlter*Plus are registered trademarks and * indicates a trademark of On-Line Software International. IBM is a registered trademark and DB2 a trademark of International Business Machines Corporation.

Pastore

FROM PAGE 37

point for desktop PCs at many companies should make upgradeable PCs more attractive. This is particularly true at the high end, where server-type boxes are starting at \$10,000 to \$20,000.

Probably picking up on these changes, the big-name vendors have finally followed the upgrade trail blazed by the second-tier vanguard. In mid-1990, NCR and Compaq introduced PCs specifically marketed as upgradeable.

And now IBM's PS/2 Model 90 and 95 come to market designed with the ability to swap 25-MHz 486 chips for 33-MHz 486s. That's a narrow upgrade range, but coming from IBM, it is still significant for the industry.

Some of the early criticism of low-end IBM-compatible upgradeable machines seems to be valid. What's the point of sticking a 486 chip in a 286-style

chassis? An AT-style bus and slow disk drives just can't do justice to the top-of-the-line processor.

But at the high end, buses, drives and other components will serve a 386 or 486 virtually as well as they served a 20-MHz 386SX CPU.

High-end PC shoppers are beginning to base their brand selections to a large extent on upgradeability. For example, most Compaq Systempro owners you talk to will say upgradeability was the chief reason they bought the machine and is the thing they like best about it. The ability to boost the processor from a 33-MHz 386 to a 33-MHz 486 is more immediately valuable than the option to add a second CPU, many say.

However, users inclined to snatch up any PC with an upgrade option should remember that these vendors aren't offering upgradeability just to be nice. One of the benefits for the vendors is that upgrade boards are proprietary. You have to buy IBM's upgrade from IBM and

pay whatever price IBM charges. The same is true for the other makers.

Therefore, users would be wise to shop around. Prices for upgrade boards vary wildly from vendor to vendor, depending on how many component chips and controllers are included with the CPU on the upgrade board.

Vendors also benefit from upgradeability because when users run out of juice on an upgrade box, they are likely to stay with the same vendor rather than shop the competition. It's sort of repeat-customer insurance for the manufacturer.

Users, in turn, must size up their vendor as if they are entering a long-term relationship, because that's what it's likely to be.

And now that IBM has added its Midas touch of legitimacy to the concept, there will be more upgradeable-PC vendors than ever to choose from.

Pastore is a *Computerworld* senior writer.

Grid unwraps I486-based network server

BY SALLY CUSACK
CW STAFF

FREMONT, Calif. — Grid Systems Corp., a Tandy Corp. subsidiary, made its first foray into the network server market recently with the announcement of an Intel Corp. I486-based system tailored around the Extended Industry Standard Architecture (EISA) bus.

Christened the Grid 486E1-25/ASVR Tower, the 25-MHz server system was demonstrated for the first time at Comdex/Fall '90 in Las Vegas earlier this month.

According to Grid, which made its reputation in the portable computer sector, the server includes nine expansion slots designed to offer users up to 4G bytes of hard disk storage capacity.

The system comes with a standard configuration that includes 8M bytes of random-access memory, which is expandable to 64M bytes, and the availability of seven 32-bit EISA expansion card slots.

System extras

An extended IBM Video Graphics Array-compatible adapter, one parallel and two serial ports and a 1.44M-byte 3½-in. floppy disk drive are also included with the system.

Users have the option to choose from a variety of peripherals, such as tape drives, hard disks, compact disc/read-only memory or write-once read-many optical disc drives, the company said.

Slated for delivery in December, the product is priced from \$11,999.

NEW AT COMDEX/FALL '90

The following is a second listing of the products and technologies announced at the Comdex/Fall '90 show in Las Vegas.

Software applications packages

Penncomp Software Development has announced a literary quote retrieval software package available for Micro: soft Corp. Windows environments.

Quotemaster Plus for Windows enables users to access more than 3,000 literary quotes on-screen.

The product uses between 2.9M and 3.9M bytes of hard disk storage and requires an IBM Personal Computer or compatible. It costs \$89; additional quote bases are \$25 each.

Penncomp Software
4660 Beechnut
Houston, Texas 77096
(713) 669-0965

Version 3.1 of Inner Media, Inc.'s Collage Plus image management and screen-capture program for MS-DOS environments includes a functional screen capture program for Microsoft Corp.'s Windows 3.0.

The product costs \$129.

Inner Media
60 Plain Road
Hollis, N.H. 03049
(603) 465-3216

Manzanita Software Systems' inventory control module is now being included with its Businessworks Integrated Accounting System.

Features of the module in-

clude purchase ordering, ready pricing information, flexible product tracking, multiple costing methods, general ledger updating and tracking of back orders.

The product runs on IBM Personal Computer XTs, ATs, Personal System/2s or compatibles and is priced at \$295.

Manzanita Software Systems
2130 Professional Drive
Roseville, Calif. 95661
(916) 781-3880

Orcad Systems Corp.'s ESP Framework is a graphical user interface that has been integrated with the company's Release IV range of DOS-based design automation tools.

Electronic designers can use the product to perform tasks that were previously nonintuitive or time-consuming, the vendor said.

ESP Framework includes an enhanced version of the company's schematic design tool set and is priced at \$595.

Orcad Systems
3175 N.W. Alciek Drive
Hillsboro, Ore. 97124
(503) 690-9881

Textware Corp. unveiled a version of its Textware text indexing and retrieval package that was designed for Apple Computer, Inc. Macintosh users.

Textware for the Macintosh is compatible with Version 3.0 of Textware for MS-DOS and local-area network platforms. It enables text and image databases to be created, indexed and used for retrieval on any of the three platforms, the vendor said.

Single-user pricing is \$495; for an unlimited number of users on a LAN file server, the price is \$2,995.

Textware
P.O. Box 3267
Park City, Utah 84060
(801) 645-9600

Roykore, Inc.'s Instant Orgcharting is an organizational chart program designed to enable users to manage information graphically.

Instant Orgcharting enables users in government or corporate environments to create and immediately update changes pertaining to employees, owners, shareholders or military personnel.

Users can choose an unlimited number of chart styles, fonts, colors and patterns, according to the vendor.

The product is available on 3½- and 5¼-in. disks. It supports Microsoft Corp.'s Windows 3.0 and is priced at \$149.
Roykore
2215 Filbert St.
San Francisco, Calif. 94123
(415) 563-9175

Peripherals

Unisys Corp. demonstrated three dot matrix printers designed for workstation environments.

The AP9210 (\$2,395) operates at 10 page/min. and features emulations for Hewlett-Packard Co.'s Laserjet II, IBM Printer XL and HP Graphics Language Plotter.

The 80-column AP1337 and 136-column AP1339 are both 24-pin devices that feature eight resident fonts and provide emulations for the Epson America,

Inc. LQ-2550 and IBM Printer X24E/XL24E machines.

List prices for the AP1337 and AP1339 are \$699 and \$949, respectively.

Unisys
2700 N. First St.
San Jose, Calif. 95150
(408) 434-2848

Facit, Inc.'s Facit P8100 is a 10 page/min. printer that is compatible with Hewlett-Packard Co.'s Laserjet II and Adobe Systems, Inc. Postscript machines.

The product enables users to design fonts, forms, logos, signatures and other graphic or text elements according to their specifications, the vendor said.

The P8100 is available in four configurations. Pricing begins at \$2,399.

Facit
400 Commercial St.
Manchester, N.H. 03108
(603) 647-2700

Personal Computer Products, Inc. has an enhanced version of its Imagescript cartridge for Hewlett-Packard Co. Laserjet printers.

The upgraded version enables users to take advantage of all ports on an HP Laserjet device. It also features multiple paper size support and front-panel control.

The product lists at \$299. The company also displayed a series of desktop laser printers that can be configured four basic ways for specific applications.

The Laserimage 2500 series features emulation for various HP Laserjet II models and operate at 11 page/min., according to the vendor.

Pricing ranges from \$3,995 to \$4,995, depending on model.
Personal Computer

Products
10865 Rancho Bernardo Road
San Diego, Calif. 92127
(619) 485-8411

Nissei Sanyo America Ltd.'s 14-in. multiscanning monitor was designed for business graphics applications.

The 14MVX low magnetic field color monitor includes ergonomic features such as a silica-based antiglare screen, a tilt/swivel base and front-panel controls. The monitor also provides IBM Video Graphics Array compatibility to 1,204-by 768-pixel resolution and compatibility with Apple Computer, Inc. Macintosh II machines.

The product is priced at \$995.
Nissei Sanyo America
800 South St.
Waltham, Mass. 02154
(617) 893-5700

Data storage

Micronet Technology, Inc.'s Micro/DAT MD-3300 Backup System was designed for IBM Personal Computer XTs, ATs or compatibles, Apple Computer, Inc. Macintoshes and Sun Microsystems, Inc. workstations.

Micro/DAT MD-3330 is based on the Wang Laboratories, Inc. Wangdat 3.3G-byte tape drive. The product includes a 16-bit small computer systems interface host adapter for use with PC systems and features an access time of 20 seconds, the vendor said.

Pricing starts at \$4,295.
Micronet Technology
20 Mason
Irvine, Calif. 92718
(714) 837-6033



Our Competitors' Vision
Of Enterprise-Wide
Computing Is Based
More On Their Interests
Than Yours.

Only One Company Is Enterprise-Wi



Building Truly Open, de Computing.

Introducing A New, More Cost-Effective Way Of Computing.

Other computer companies' vision of enterprise-wide computing usually entails you buying their products exclusively. And their products often have hidden hooks that lock you into buying decisions you might not otherwise make.

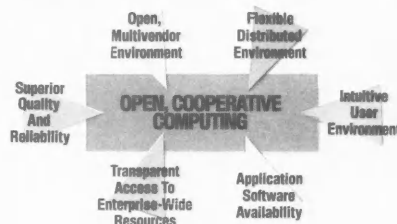
NCR's Open, Cooperative Computing is different. It's the first truly open blueprint for enterprise-wide computing.

Designed to allow rapid assimilation of new technology through the use of standard hardware, software, and networking interfaces.

Since we released our strategy in February, we've received enthusiastic response from organizations of all sizes, in all fields of endeavor. Not being tied to proprietary architecture allows us now to introduce a suite of open systems hardware, software, and networking products based on the highest performance, lowest cost, most feature-rich technologies in the industry.

On the next few pages, you'll find a preview of our new products. A new family of scalable systems offering an unprecedented range of cost-effective power. And an intuitive software environment that, combined with new open networking products, can bring your enterprise together as never before.

Products designed to work with your current information systems, while providing a bridge to truly open, enterprise-wide computing.



The Most Cost- To Reach New L



How To Build Truly Open, Enterprise-Wide Computing.

I am interested in finding out more about NCR's approach to building a truly open, enterprise-wide computing environment.

- ☐ Please have an NCR Sales Representative contact me.
- ☐ Please send NCR's "How To Build Truly Open, Enterprise-Wide Computing" brochure.
- ☐ Please send a brochure on the NCR System 3000.
- ☐ Please send a brochure on NCR Cooperation.
- ☐ Please send a brochure on NCR's Open Networking Environment.



Name _____

Title _____

Phone _____

Company/Organization _____

Address _____

City _____

State _____

Zip _____

SP-4051



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 3 DAYTON, OHIO

Postage will be paid by addressee

NCR Corporation
UNITED STATES GROUP
PO. BOX 606
DAYTON, OHIO 45401

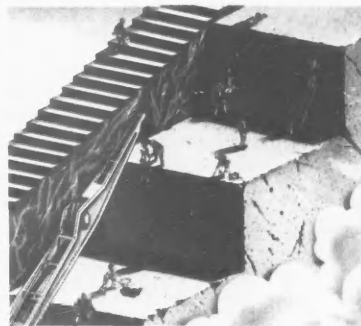


Effective Way Levels Of Power.

Introducing The NCR System 3000 Family Of Scalable Processors.

Microprocessor technology has reduced the cost of processing as much as 100 times compared to conventional computing architectures. In the near future, that cost advantage will grow to more than 300 times.

The NCR System 3000 brings this step-change in technology to a complete family of scalable platforms, running open operating systems like UNIX®, OS/2 and MS-DOS. The System 3000 is designed to connect to your current systems environment, while providing a transition to the more cost-effective, flexible, open environment of the future.



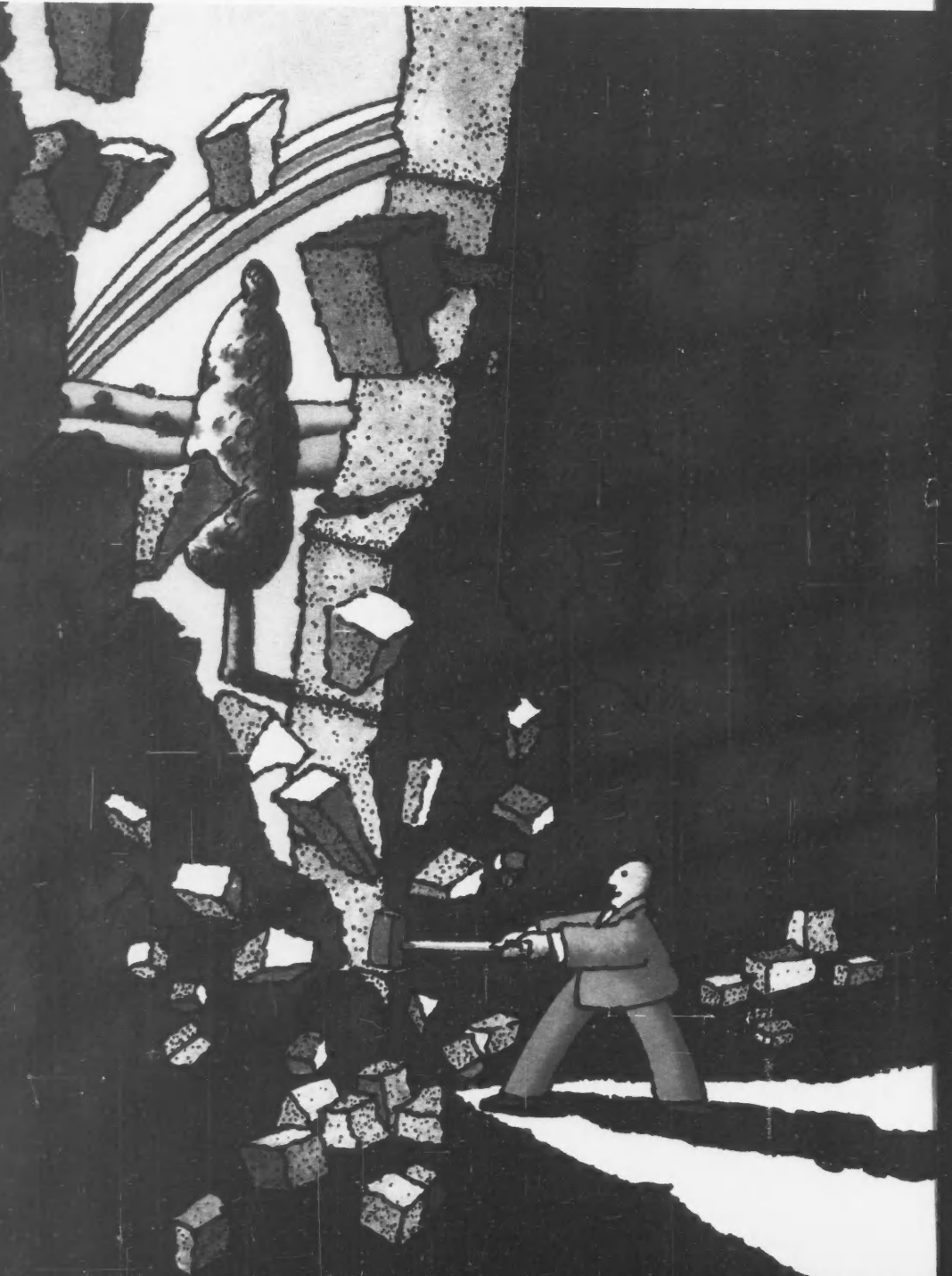
The NCR 3000 lets you add processing power in cost-effective, incremental steps, rather than large, expensive ones.

From desktops and large servers to future massively parallel models offering more than 100,000 MIPS, our new System 3000 family will provide an unequaled range of performance. So you can add the power you need, when and where you need it.

The NCR System 3000 takes advantage of the Intel® x86 chipset series—the most powerful microprocessors available—to provide you flexibility in design and integration, and an extensive set of existing applications, tools and peripherals. In fact, this new system will be among the first to use Intel's new 50MHz i486® microprocessor in a multiprocessing design.

The System 3000 offers total scalability of hardware *and* software, and complete object code compatibility, to give you access to an enormous application software suite. Three levels are now released for sale—offering performance from 7.5 to 320 MIPS. And support for the computing needs of one to hundreds of users.

Free Your Org The Limitations Of

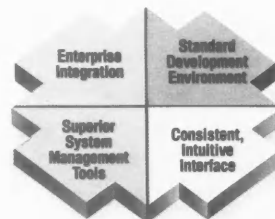


ganization From Conventional Systems.

Introducing Cooperation.[™] The Open Enterprise Integration Environment.

Conventional systems have spawned islands of information that separate departments and impede workflow more effectively than any wall.

The answer is NCR Cooperation. Software that integrates the general-purpose applications and platforms in your organization into one flexible, cooperative system with a consistent, intuitive graphic interface.



Cooperation benefits everyone in your organization. It lets MIS managers integrate multimachine, multivendor, multistandard environments, with the tools needed to create and manage a complete enterprise-wide network.

Its Business Information Monitor facilities allow executives to access the entire knowledge base of the enterprise from their own workstations.

And it aids software developers by speeding both new application development and the extension of conventional mainframe and mini-computer applications.

Cooperation allows access to your enterprise's resources from every desktop. It features powerful tools, including the latest in distributed *object* technology, that insulate both software developers and users from the complexities of the operating environment. Object-oriented programming lets developers reuse code, easing the job of building or modifying complex programs. And reducing the time and cost of development and training.

Cooperation can set your organization free from the rigid, hierarchical computer architectures of the past. Free from dependence on the vision of a single vendor. Free to meet the challenges of the future as you see fit.

Introducing The First Network Without Proprietary Roots.



NCR's new Open Networking Environment™ offers the first set of end-to-end networking products based on the Open Systems Interconnect (OSI) model.

Open Networking System™ (ONS)—an intelligent networking system—is designed to implement all seven layers of the OSI reference model to provide intelligent network application services and extensive inter-networking capabilities.

It also interconnects varied LANs and WANs to help leverage your existing investment and save money by sharing communications resources. Its extensive SNA capabilities let you coexist with conventional networks while moving to an open environment.

ONS simultaneously bridges or routes:
OSI
TCP/IP
SNA
DECnet
NetWare IPX
XNS
NetBIOS
DEC LAT
X.25
AppleTalk
Ethernet
Token Ring
StarLAN
And more.

ONS also supports network management:
CMIP/CMISE
SNMP
NetView
NET/MASTER

The Open Networking Environment also includes the powerful network management capabilities of NCRNet Manager. Also OSI-based, NCRNet Manager provides centralized management of both the internetworking environment and its attached systems.

The Network Without Wires.

The new NCR WaveLAN uses radio waves to let you build an industry-standard LAN without wires. So you can put people and PCs wherever you need them. Without the time and cost of installing or moving a wired LAN.

For more information, phone 1-800-CALL NCR.

We'll help you grow truly open, enterprise-wide computing.



Open, Cooperative Computing.
The Strategy For Managing Change.

NETWORKING

AT&T boosts T1, T3 user control

BY ELLIS BOOKER
CW STAFF

BASKING RIDGE, N.J. — AT&T recently gave users of its high-speed lines a better way to manage their private networks, announcing a service that allows customers to reconfigure and reserve T1 and T3 circuits from a personal computer.

The Accunet Bandwidth Manager (ABM) works with AT&T's T45 (45M bit/sec.) and T1.5 (1.54M bit/sec.) Accunet services and is a follow-on to AT&T's Customer Controlled Reconfiguration, an on-line provisioning service AT&T has offered since 1982.

ABM fits with several other high-bandwidth network services — increasingly seen as essentially for imaging applications, disaster-recovery applications and LAN-to-LAN connections, among other uses — that AT&T and its competitors have been announcing during the past few months.

Two weeks ago, for example, AT&T announced plans for a switched T1 option for its Accunet private-line service. Combined with ABM, users could conceivably arrange for T1 traffic to go over the switched facility, in the event a network outage disrupted their conventional

T1s. Users could also redirect downed circuits over alternative AT&T T1s or the public network. In addition, ABM alerts customers to faults and downed links, setting off an alarm on the user's terminal.

AT&T, which hopes to have ABM in 50 cities by mid-1991, said the provisioning changes made through the software occur in less than three minutes and that a T1 circuit requested through ABM can be provided in less than one day.

Bandwidth can be reserved at 56K bit/sec. or 64K bit/sec. increments up to a T1 channel, including intermediate rates of 128K, 256K and 512K bit/sec.

Operator bypass

Regarding the provision of T3 circuits, AT&T said customers will, for the time being, need to reserve these lines through a call to an AT&T operator. But this, too, will be handled by ABM in the future, said AT&T, which hopes to have the T45 Reserved available by the first quarter and ready in 90 cities by the middle of 1991.

Through the ABM software — which requires an MS-DOS PC running Microsoft Corp.'s Windows 3.0 — users connect over a 9.6K bit/sec. dial-up or dedicated line to an ABM con-

troller in one of AT&T's facilities. The controller, a Sun Microsystems, Inc. Sunserver 490, in turn sends commands to a digital access and cross-connect system in AT&T's network to reconfigure users' circuits.

Bear, Stearns & Co. in New York already has bandwidth and reconfiguration on demand through its internal system, according to managing director of communications Jeff Marshall. He said that if Bear, Stearns migrates to a packet-switched backbone, the ABM service (designed for circuit-switched networks) would be even less applicable to his situation.

Meanwhile, Jim Williams, manager of network engineering at Mervyn's, the Hayward, Calif.-based department store chain, definitely wants flexible bandwidth on demand and would take advantage of the new AT&T service but said he is limited by the front-end processor in his Systems Network Architecture backbone.

"The computer program in the [front-end processor] that has our net configuration would have to be taken down and reloaded," said Williams, who monitors the logical portion of his network with IBM's Netview and the physical links with an AT&T Dataphone II controller.

Britain OKs sharing lines to other nations

BY ELISABETH HORWITT
CW STAFF

LONDON — Opening the way to less-costly global connections, the UK Ministry of Trade and Industry became the first such body to permit the sharing and reselling of lines between the UK and other countries. The ministry also announced that it will permit two-way very small aperture terminal satellite communications.

"This is a watershed event that changes the whole economics of telecommunications for corporate users," said Leonard Elfenbein, president of Lynx Technologies, Inc., a Little Falls, N.J., market research firm.

A corporation will be able to realize significant savings on U.S.-to-European transmissions by leasing lines from the U.S. to the UK and then either reselling or sharing the cost of those links with other firms, according to Elfenbein.

In addition, a whole new industry will spring up as private corporations and network service vendors "can get a large chunk of bandwidth and parcel it out to users," said Douglas Fields, manager of telecommunications at United Parcel Service's Information Services Division. Such providers "can make

some money and still sell at lower costs" than traditional direct-dial and leased-line rates, he added.

Fields said UPS will look very closely at all three options that the UK ministry's decision has opened up: purchasing circuits from resellers, leasing its own lines and reselling them and sharing lines with other companies. "We could resell lines to our customers; we can have business relationships with them that go beyond sending packages."

Follow the leader

Other European administrations, particularly those in France, Germany, Spain and Italy, are likely to quickly follow the UK's lead, Fields said.

"Those countries are in the throes of deregulation and hungry for business; they don't want people moving all their traffic through the UK," Fields added.

As long as the UK is the only country that permits sharing and reselling of bandwidth, it will be much more cost-effective for U.S. businesses to route their traffic over a shared link to a UK gateway to other countries than to set up separate connections to European nations, Elfenbein said.

Airline training takes flight with LANs

ON SITE

BY JIM NASH
CW STAFF

VANCOUVER, B.C. — In a darkened room, the pilot trains, mouse in hand. Next to the aviator, in another cubicle, sits a mechanic who is brushing up on maintenance procedures.

They and 10 or so other hushed Canadian Airlines International employees are using the company's new training facility here. Three identical facilities are located in the airline's Toronto center.

Each center resembles an elegant airport control room. Each trainee sits wearing headphones in front of large color VDTs, pointing and clicking through multimedia video courses.

Canadian Air's training program is heavily dependent on local-area network technology. In fact, said Don Gerke, one of the program's creators, after looking at the mainframe solutions other airlines used for training, he concluded that LANs alone of-

fer the throughput and flexibility to teach individual employees efficiently.

Gerke, project pilot for the airline's advanced training systems, said Canadian Air's 5-month-old Ethernet LAN allows trainees to move at their own pace through government-mandated lessons stored on a shared database. The system replaces a low-tech training program that included audiovisual classroom instruction.

He explained that the more rigid mainframe systems other airlines use can hold the progress of an entire class to the pace of the slowest trainee. Allowing trainees to move through their courses independently gives Canadian Air flexibility in scheduling.

This, according to Jean Pierre Deshaies, manager of Canadian Air's simulator systems development, is expected to save \$10 million in personnel costs over four years compared with what executives expected to spend by using mainframe-based training. Deshaies said the firm's training

program so far has cost \$4.5 million and is under budget. Delayed schedules, a fact of life when teaching groups in unison, can cost \$20,000 per day for a class of 20, he explained.



Canadian Air relies on LANs to individualize training

Just as important as savings, said John Lok, a consultant on the project, is trainee acceptance, which has been high.

The mechanics and pilots are

using simulators in training for the "glass cockpits" of The Boeing Co.'s 767 and 747-400 and Airbus Industrie SA's A320 — planes in which pilots monitor an increasing number of

The Hewlett-Packard Co. workstations that trainees use display simple computer graphics and high-quality videotaped snippets of airliners. The graphics represent each component, switch and keyboard in a plane that is serviced by mechanics or used by pilots. Employees use a mouse to answer questions about their functions and perform tasks such as extending flaps.

"You don't need a plane to train anymore," Gerke said. What Canadian Air did need before installing the new hardware and software, was a standards-based network with enough throughput to distribute data and digital audio simultaneously to a group of independent courseware users.

"We have a real hodgepodge of technologies in the training world, a lot of which is proprietary and poses compatibility problems," he said. "Canadian Airlines wanted to be hardware independent."

Wicat Systems, Inc. in Orem,

Continued on page 50

Tools offer way to save internetworking costs

Enterprise Router is bridge/router alternative

BY JOANIE M. WEXLER
CW STAFF

IBM users can buy themselves a little time for making large investments in internetworking equipment, thanks to a couple of recent innovative announcements from Micro Tempus Corp. and Micro-Integration.

Waltham, Mass.-based Micro Tempus is shipping the Enterprise Router, a software product that sits in VTAM on an IBM MVS-based mainframe and serves as a bridge/router alternative for connecting multiple Microsoft Corp.-based local-area networks through the mainframe. VTAM is IBM's front-end access control program.

Enterprise Router allows an existing Systems Network Architecture (SNA) network to serve as a LAN internet with one investment — \$20,000 to \$100,000, depending on mainframe processing capacity — instead of buying multiple source-routing bridges for linking each

local area network.

The trade-off is that the software gobbles processing power, "so candidates for the product are organizations not running heavy-duty applications — such as transaction processing —

ENTERPRISE Router allows an existing Systems Network Architecture network to serve as a LAN internet.

through the software," said Tucker McDonagh, president of South Norwalk, Conn.-based consultancy Tucker Network Technologies, Inc.

Southern Illinois University in Carbondale, Ill., has been using the Enterprise Router for six months and was previously a beta-test user.

"We had extensive SNA networks that we needed to tie into our LANs," explained Larry Hengehold, director of computing affairs. Hengehold explained that SIU's data center contains an IBM 3090 mainframe, and the university runs more than 50 LANs "of all shapes and sizes."

According to Hengehold, the router software is beneficial in that "not all organizations can afford to buy all the bridges they need at one time. This has been a lifesaver for us by allowing us to build a general-purpose 'bridge' for a while and control our expenses."

Hengehold added that the mainframe has burned "negligible" processing power because of the Enterprise Router, "though we're only six months into it."

SIU fits McDonagh's user profile, as it uses the software for light applications, including electronic mail; nighttime backup and recovery; and the exchange of small to medium-size data files.

SIU does run some Apple Computer, Inc. Appletalk and Novell, Inc. LANs, which are not yet supported by Enterprise Router. Those LANs link to the SNA network over a campus Fiber Distributed Data Interface backbone network using Cisco

Systems, Inc. AGS+ routers, Hengehold said.

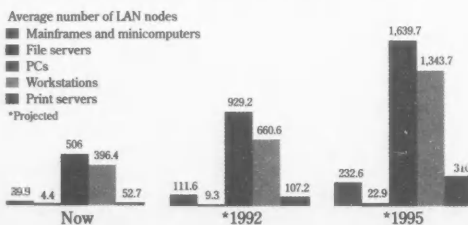
Micro-Integration in Friendsville, Md., is shipping software — dubbed Blue Lynx — that allows four gateways to be combined into one Intel Corp. 80286-based personal computer to interface multiple IBM Netbios-compatible LANs running 5250 emulation with IBM's Ap-

cols, such as Novell. Users have been frustrated by this."

Doug Goldstein, LAN administrator at Vyvx Telecom, Inc., a long-distance carrier in Houston, is using the previous version of Blue Lynx to tie his Banyan Systems, Inc. Vines LANs into two interconnected AS/400s. He said he is eager to receive his \$595 upgrade.

LAN booster

Projected LAN growth spurts will naturally drive the market for equipment to interconnect networks to each other and to hosts



Source: The Yankee Group

CW Chart: Doreen St. John

plication System/400 midrange computer.

"The more equipment you can connect to the AS/400, the better," McDonagh said. "The AS/400 is a strategic platform, and it has been difficult to gateway into it from nonnative proto-

"Being able to put four gateway cards into one dedicated PC means I won't have to tie up a PC per gateway," he said. "Right now I'm running two gateways on one PC and another gateway on another. This will free up a \$2,000 PC for me."

It's the fastest But it will never cat

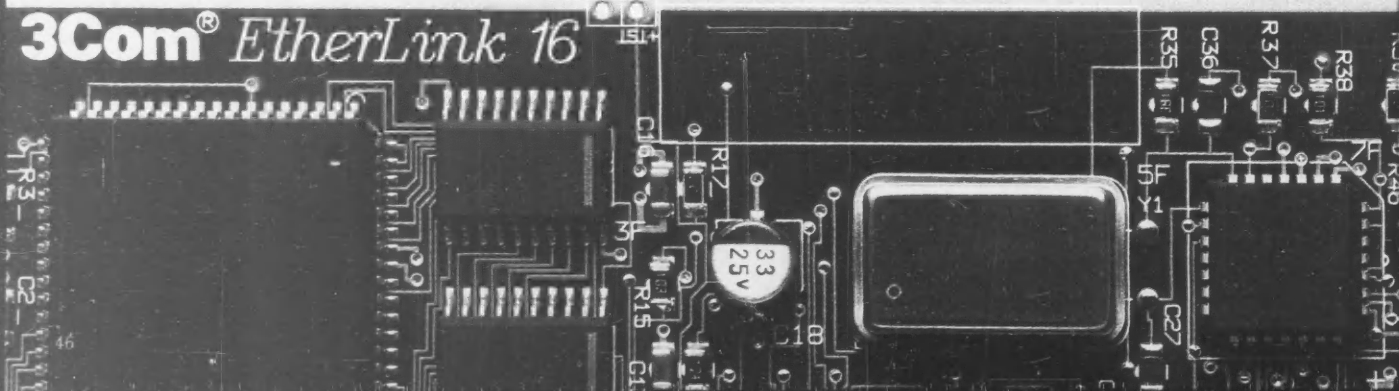
You can go fast. You can go safe. Just not together. Until EtherLink® 16.

This 16-bit Ethernet network adapter is up to 90 percent faster than its major competitors*. Yet it runs with a lifetime warranty.

You can use it with your IBM PC, XT, AT, PS/2 Model 25 or 30 and compatibles, as well as EISA computers. And it's ready to run on NetWare, LAN Manager and 3Com® 3+Open.

What's more, EtherLink 16 is speedy to install,

*An independent laboratory, LanQuest Group, did the testing, and you can get a copy of their glowing report on speed by calling us at 1-800-NET-3Com. You can also request the data on reliability, and learn why that of two million 3Com adapters in use, 99.5 percent have never needed repair.



Net managers look with favor on 3Com alliance

BY JIM NASH
CW STAFF

Network administrators expressed optimism about 3Com Corp.'s announcement this month that it will ally itself with Palindrome Corp., a third-party manufacturer of tape backup devices.

The partnership is expected by some network managers to result in a write-once read-many (WORM) device bundled into 3Com's 3+ Open network operating systems. However, the political implications of the Santa Clara, Calif., networking company establishing third-party relationships has also sparked enthusiasm.

Palindrome, in Naperville, Ill., now builds tape backup devices exclusively for networking giant Novell, Inc. A spokesman for the 2-year-old company said the two firms are co-developing memory backup systems to run on Microsoft Corp.'s LAN Manager network operating system, which underlies 3+ Open.

Don Barry, network adminis-

trator at Ochsner Medical Institutions in New Orleans, said 3Com users are likely to be more heartened by the news of third-party support than by the possibility of WORM backups.

"It means we won't be running in a vacuum," Barry said. He pointed to the myriad third-party relationships that Microsoft and Novell cultivate. The relationships, he explained, give users confidence that a vendor's product has staying power. They also sometimes mean greater affordability.

Attitude problem

"For the longest time, 3Com had this big attitude: 'We have the best, and no one can come close to us,'" said Fred Skrotzki, supervisor of software development and hardware integration at Jam, Inc. "But if you couldn't afford a 3Com [backup device], you had to go to another vendor, like Novell." Jam is a software developer in East Rochester, N.Y. Skrotzki said 3Com users whose budget could not absorb the approximately \$7,000 sys-

Users seek Novell bridge options

BY JIM NASH
CW STAFF

With Novell, Inc.'s protocol bridge lurking someplace in beta testing, network managers are turning to third-party solutions to unify heterogeneous computer environments.

Some administrators said they are frustrated by frequent updates to Novell's internet packet exchange (IPX) networking protocol. Those acutely affected are managers who are required to have the company's network operating system, Netware, work closely with machines using Transmission Control Protocol/Internet Protocol (TCP/IP).

Provo, Utah-based Novell told users when it announced

tem purchased other vendors' backups, which often did not work fully with 3Com networks.

Skrotzki, who is the leader of a New York 3Com user group, said strong third-party relationships also mean a better chance for parts and service if a local 3Com reseller closes or changes stripes.

Netware 386 in May 1989 that IPX-based Netware 386 had been architected to accommodate a bridge between the two protocols. The company has yet to say when it will deliver such a tool.

Out of beta

However, according to a manufacturing sector user of Netware who requested anonymity, Novell executives said a bridging device is out of beta testing and will be distributed to a select number of users before the end of the year. Analyst Craig Burton at Clarke Burton Corp. in Salt Lake City said he, too, had heard that the product has been in beta testing.

The user said his peers dislike being at the mercy of frequent IPX updates and would rather run TCP/IP packets on Netware networks via a bridge.

One firmware product that addresses the problem, SK-Net by Schneider & Koch in Karlsruhe, Germany, is gaining grudging endorsement.

At the moment, SK-Net is one of the few answers available to test managers who must reconcile heterogeneous environ-

ments enough to share files and electronic mail.

David Walker, network services manager at the University of California at Irvine, said he purchased several SK-Net smart Ethernet adapter cards. The cards "know how to tunnel IPX inside TCP/IP," Walker said. The cards, which cost \$1,500 each, wrap TCP/IP packets in IPX envelopes in order to transmit them to Netware servers or other TCP/IP systems such as Unix, where they are unwrapped again.

Though the process of wrapping and unwrapping packets is prone to degradation, he said, SK-Net beats other alternatives. Walker said he rejected gateways between the two protocols because of the performance hit the system took.

Rebooting is necessary, Walker said, when switching between protocols.

The SK-Net itself is not without problems, Walker noted. He explained that he has been unable to get the boards to recognize more than one other board on the network, making distributed processing difficult beyond pairs of servers.

board available. ch up to its warranty.

because there are no jumpers to slow you down.

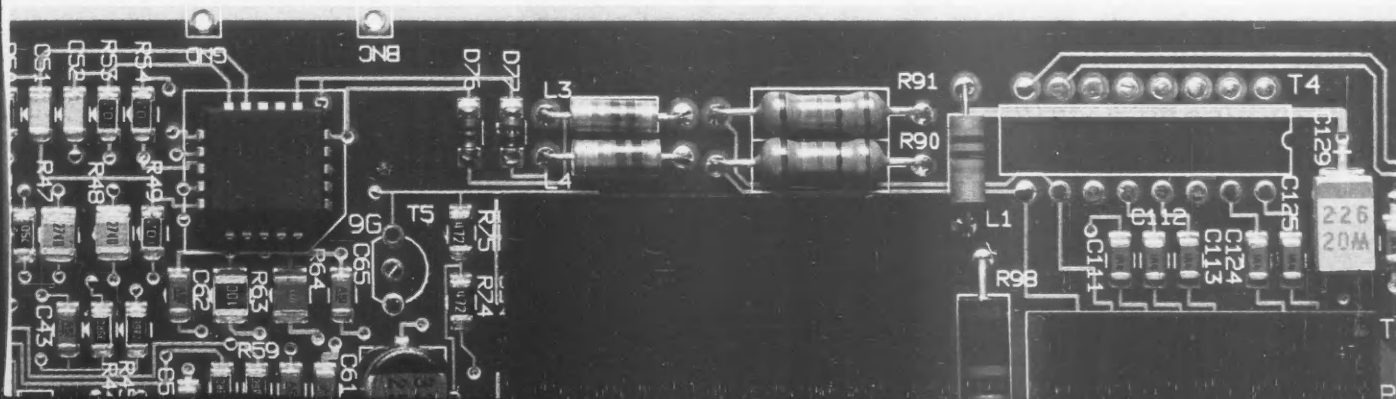
But why not see for yourself?

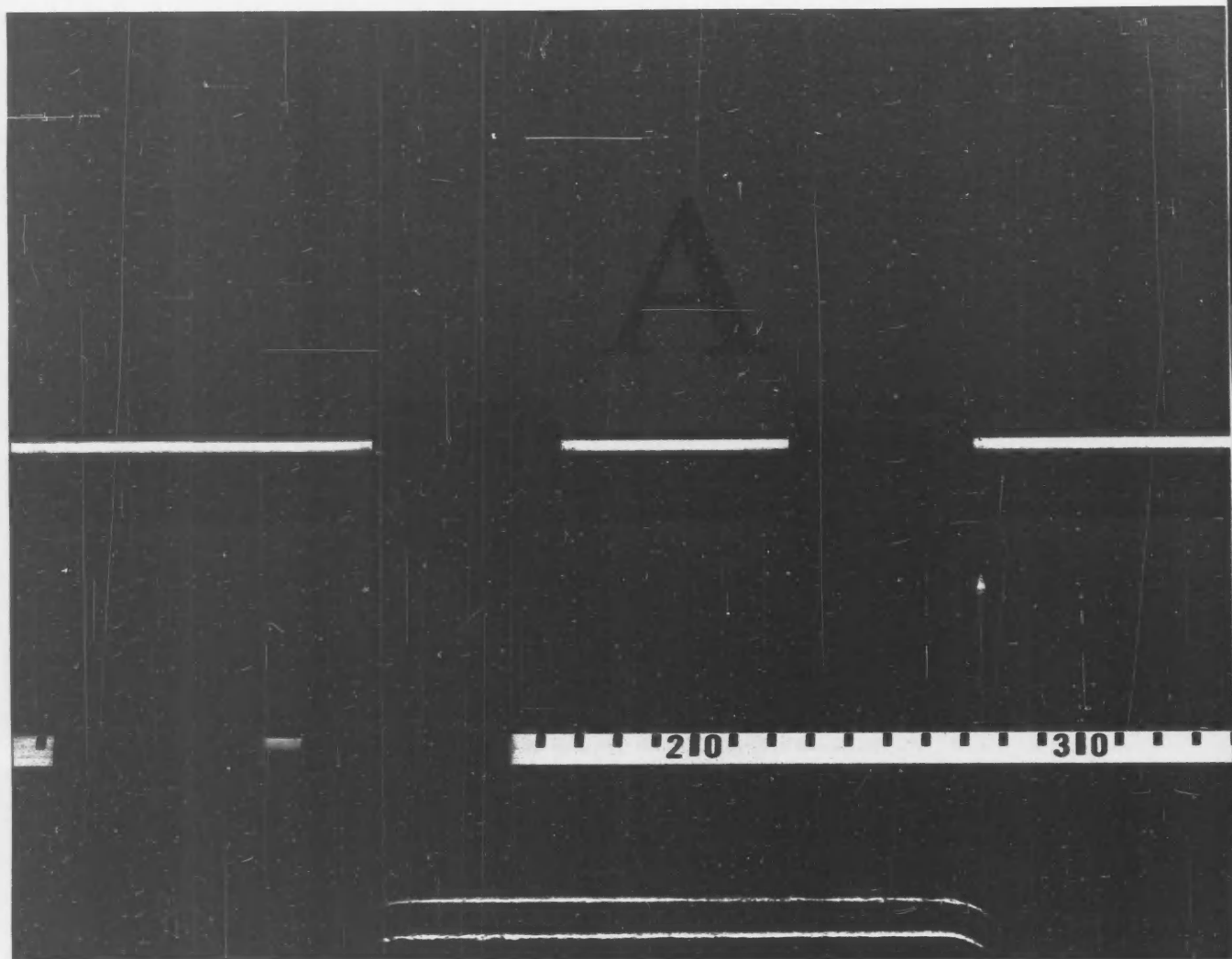
Just call 1-800-NET-3Com Dept. D5056 for the name of your nearest 3Com reseller.

3Com

We network more types of systems
to more types of systems.

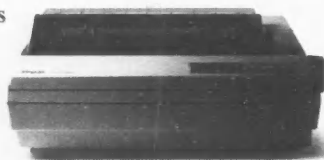
©1990 3Com Corporation, 5400 Bayfront Plaza, Santa Clara, CA 95052. Telephone (408) 764-5000. 3Com, 3+ Open, EtherLink and the 3Com tagline are trademarks of 3Com Corporation. IBM, XT, AT and PS/2 are trademarks of International Business Machines Corporation. NetWare is a registered trademark of Novell, Inc. Lanquest is a trademark of Lanquest Group.





Do anything and you would

For 25 years, Epson® printers have placed ink on paper with fine-crafted precision and ever-increasing speed. Each character as impressive as the last. A feat that Epson 24-pin printers have



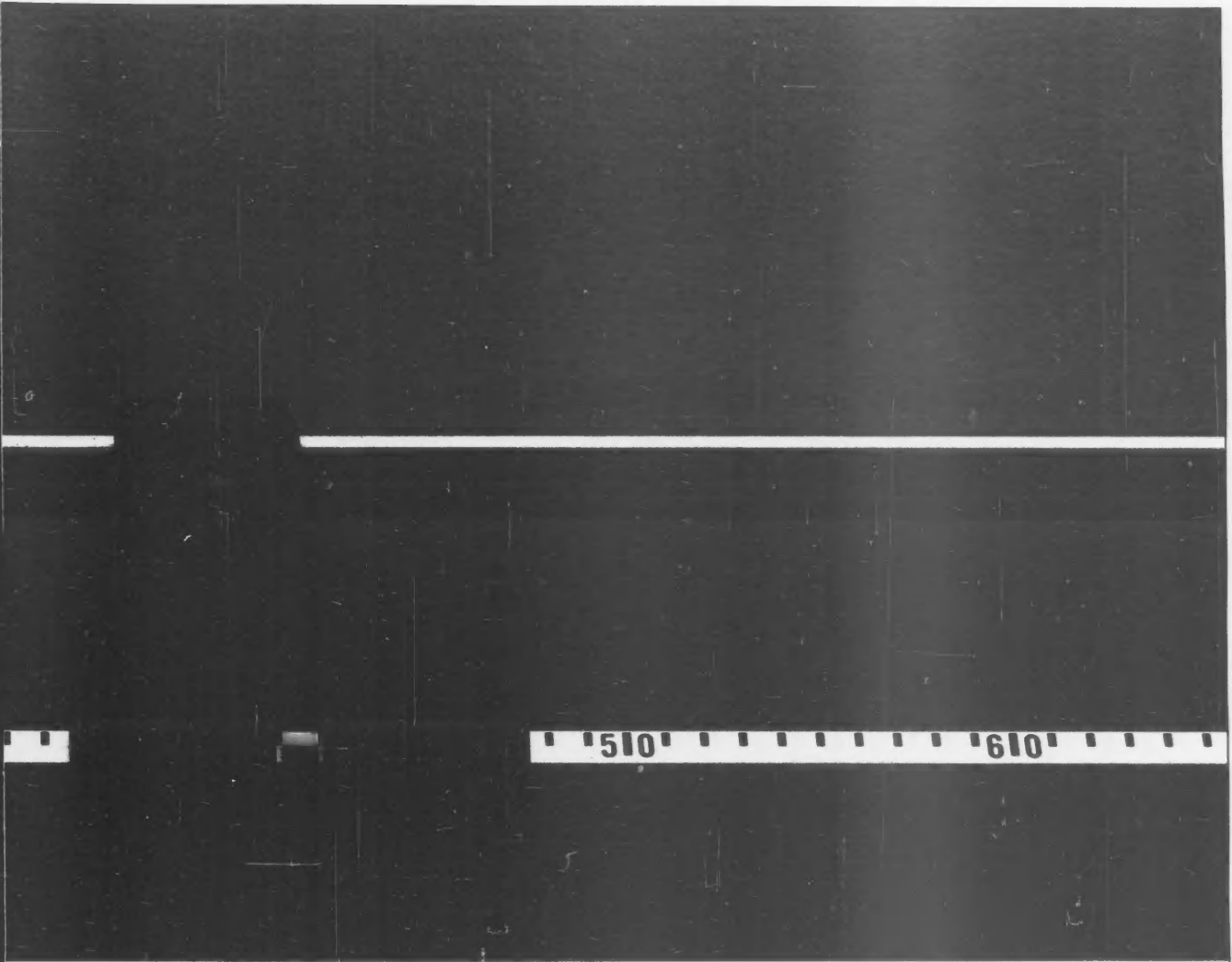
2 Year Warranty

Just one more measure of how dependable your Epson printer will be.

accomplished 15 trillion times over.

Today, dot matrix is the most widely used printing technology in business. Of course, the most widely used dot matrix printers are made by Epson. The very

Two year warranty available on all Epson printers, except the LQ-2550 and DFX Series which offer a one-year limited warranty. Epson is a registered trademark of Seiko Epson Corporation.



15 trillion times be good at it, too.

company that invented them two decades ago.

Epson printers—from dot matrix to laser to inkjet—are the epitome of reliability. But where there is brawn, there is also a brain. Consider Epson's ingenious SelecType™ control panel and

skillful SmartPark™ paper handling. These and other conveniences make operating an Epson as flawless as the printing.

We could go on. But you already have 15 trillion reasons to choose an Epson.

Engineered For The Way You Work.™

EPSON

PC software melds four telecom tasks

BY JOANIE M. WEXLER
CW STAFF

Many diversified global companies still must deal with the realities of seemingly old-time technologies — Telex and TWX — as the premier mode of communications in some corners of the world.

One user recognized the need for combining those methods with facsimile and modem communications, and the result is an integrated personal computer software package that IDR Unicomp, Inc. in Plymouth Meeting, Pa., is now shipping.

The product, Via PC Telecommunications Software, runs on IBM PCs and compatibles — including laptops — and uses one common user interface for the four communications modes. It includes such menued items as a list of country codes from Albania to Zimbabwe, as well as time zone differentials for all countries. Installation time is five to 10 minutes, the vendor said.

The product, which is available for DOS platforms only, requires 640K random access memory. Thus, an Intel Corp. 80286-based PC must be dedicated to running the software.

The product was functionally designed by users. The impetus for it came when Ingersoll-Rand's Engineered Pump Division said it was looking to

streamline its Telex procedures.

"We had a full-time Telex operator who would retype messages scribbled by users," explained Greg Stauffer, PC coordinator. "We were handling each message several times, and this was inefficient."

Stauffer explained that with the company doing business in the U.S., Europe, the Middle East and the Far East, its primary overseas form of communication is Telex, and in the U.S., it is fax. He said the company could not find anything commercially available on the market to integrate these functions, so it approached Gary Edling, then founder and president of International Data Refile, a store-and-forward Telex and TWX switching service. Edling is now president of IDR Unicomp.

The result was a product that "scans for any type of document in a specified directory every 15 minutes," Stauffer said. "When it finds one, it dials a modem automatically and directs the document to a fax, Telex or TWX number."

He added that 180 of his 300 PCs are attached to a network, and "any one of those 180 can use the software" through the dedicated Via PC server. He added, though, that his site license allows 10 users to simultaneously activate the software; others trying to transmit at the same

time have to wait in a queue.

Larry Cynar, an analyst at San Jose, Calif.-based research firm Dataquest, Inc., said, "I would think there would be a pretty good market for such an integrated package. However, some services, such as Western Union's Telex, will perform this function for you already. What happens if the user already subscribes to such a service independent of the software?"

More modems

Cynar said that while he sees a lot of fax replacing Telex and TWX, "modems are everywhere." He estimated a 1 million-node-per-year worldwide growth in modems from 3 million in 1989 to 5 million in 1991, particularly at the low end, which is not yet saturated. "However, there's virtually no continuing development of large networks on analog modems," he said, citing the home market as the biggest target for the products.

Edling estimated that Telex and TWX will be around for at least 80 years "because of the billions of dollars needed to upgrade telecommunications systems in Third World countries." He said a version of Via PC for Novell, Inc. Netware networks is planned by year's end. "We will also be developing the package for other network operating systems."

NEW PRODUCTS

Local-area networking hardware

Commtext, Inc. has introduced a fiber-optic interface designed for use in multimedia local-area network environments.

The CX-80 acts as a central controller for connecting audio, video and data resources, which can then be distributed to attached personal computers. A complete Integrated Services Digital Network Primary Rate Interface for voice and data, as many as three television channels and one channel from each PC are linked to the fiber-optic connection via a multiplexer.

Pricing begins at under 10,000 per workstation. Commtext
1655 Crofton Blvd.
Crofton, Md. 21114
(301) 721-3666

Puredata Inc. has announced three Ethernet cards that feature support for 10Base-T.

The products, part of the 8023 series of Ethernet cards, include the PDI8023-T1 (\$345), an eight-bit interface card designed for IBM Personal Computer XT's and AT's; the

PDI8023-16T1 (\$395), a 16-bit card for AT- or Intel Corp. 80386-based file servers and workstations; and the PDI8023-T2 (\$475), a 16-bit interface card for IBM Micro Channel Architecture-based file servers and workstations.

All three models are compatible with the IEEE 802.3 Ethernet standard.

Puredata
1740 S. I-35
Carrollton, Texas 75006
(214) 242-2040

Ancor Communications, Inc. has announced a local-area network system based on fiber-optic technology.

The CXT for LAN-based systems was designed for personal computer-based LANs. It runs transparently under Novell, Inc.'s Netware 386 and enables each workstation on a LAN to communicate at 44M bit/sec. The list price is approximately \$2,000 per connection.

Ancor Communications
6130 Blue Circle Drive
Minnetonka, Minn. 55343
(612) 932-4000

Front ends, multiplexers

Teleprocessing Products, Inc. has introduced a fractional T1 multiplexer that can be configured with one to eight channels.

The TP-9000 can be used as a point-to-point T1 multiplexer or as a fractional T1 multiplexer when used with a common carrier's fractional T1 service.

The product provides as many as eight V.35 terminal interface channels in a 56K bit/sec. constant or controlled carrier as well as 64K, 128K, 256K, 384K, 512K and 768K bit/sec. configurations.

Pricing ranges from \$3,365 to \$6,380.

Teleprocessing Products
4565 E. Industrial St.
Simi Valley, Calif. 93063
(805) 522-8147

Customer-premises equipment

Network Equipment Technologies, Inc. has announced a product that allows companies to extend public, private or hybrid networking services from central to remote company locations.

The Adnx/48 Integrated Access Manager can be used to multiplex voice and data applications onto T1 facilities for access into a public carrier network or

BIT BLAST

Nynex group explores digital radio technology

Nynex Science and Technology has applied to the Federal Communications Commission for an experimental license to test and evaluate the feasibility of using digital radio technologies as an alternative for existing wire methods of transmitting telephone calls. Deployment of wireless services could potentially lower the cost of local loop connections, Nynex said.

Open systems vendor The Wollongong Group, Inc. has reportedly signed a value-added reseller (VAR) agreement with Walker Richer & Quinn, Inc., a developer of data communications software, to allow Wollongong's Transmission Control Protocol software to MS-DOS machines to be incorporated in the VAR's networking products.

Connections in Fullerton, Calif., has published a Network Product Guide, a 150-page compendium of 400 products in the areas of Apple Computer, Inc. Macintosh local-area networks, Macintosh links to Digital Equipment Corp. VAXs, Macintosh-to-Unix connections and Macintosh-to-IBM connections. The guide is priced at \$19.95, plus \$2 shipping.

The midyear edition of *EDI Yellow Pages*, published by EDI, Spread the Word in Dallas is now available. The publication contains listings of electronic data interchange vendors, service companies, users, consultants and other organizations worldwide.

Airline

FROM PAGE 45

Utah, and Seattle-based Boeing have created much of the market's software and hardware. Wicat's proprietary setup, however, makes running any other vendor's software almost impossible, Gerke said. It also limits the number of Intel Corp. 80386-based personal computers that can log on to a central mainframe or minicomputer simultaneously.

In each of Canadian Air's four training rooms sits a Compaq Computer Corp. Systempro as a file server. The Systempro stores audio data and controls the videodisc players on each trainee's desk. A Cogent Data Technologies, Inc. E/Master II 16-bit adapter card is slotted in the server, which also ports an Extended Industry Standard Ar-

chitecture (EISA) bus for added throughput. The network operating system is Novell, Inc.'s Netware Version 3.1 on Ethernet, which was installed in July.

Both Deshaies and Gerke said they were surprised by the Cogent card's performance. "It blew the socks off Novell's NE3200 32-bit card," Deshaies said. The Cogent card takes control of the EISA bus to guide data flow without having to go through the CPU, Gerke added.

One card on a server, Deshaies said, can support up to 16 users concurrently. "We were worrying that we would have to go with [Fiber Distributed Data Interface] in order to put that many trainees on one server, each of them accessing data, video and audio. Now, he said, the only talk of FDDI is in running a backbone between the existing training room with the second one being built down the hall.

into a company's private backbone network. It supports public carrier service offerings ranging from fractional T1 to fully loaded T1 lines, the vendor said.

Pricing ranges from \$3,100 to \$4,200 for eight-, 12- and 24-slot models.

Network Equipment Technologies
800 Saginaw Drive
Redwood City, Calif. 94063
(415) 366-4400

Timeplex, Inc. has announced an intelligent networking system that enables customers to connect remote sites to backbone networks.

The TX1/Access System was designed to handle AT&T Data-phone Digital Service switched 56K bit/sec., fractional T1 and T1 requirements. It provides two- and four-wire connectivity and is available in three models: the eight-slot TX1/S for small access sites, the 12-slot TX1 version for intelligent channel bank applications and the 24-slot TX1/E for large access sites.

Pricing ranges from \$3,150 to \$16,500, depending on type of model.

Timeplex
400 Chestnut Ridge Road
Woodcliff Lake, N.J. 07675
(201) 930-4607

MANAGER'S JOURNAL

EXECUTIVE TRACK



Virginia M. Alster has been named manager of systems and programming at the **South Carolina State Port Authority** in Charleston, S.C.

Alster was previously associate director of information resource management at Colgate-Palmolive Co. She managed a 15-person strategic planning group and led the development of domestic and international systems.

She holds a bachelor's degree from St. John's University and an MBA from Adelphi University.

.....
Nader Kury has been named principal systems analyst for the city of **Berkeley, Calif.** He will be responsible for implementing a financial management system.

Kury was formerly a programmer/analyst at the Alameda County Water District in Fremont, Calif.

.....
Ariel Sharon at Argonne National Laboratory in Argonne, Ill., has been elected vice president of industry at the **Society for Computer Simulation (SCS).**

SCS is a professional technical society devoted to applications of computer simulation. SCS members include employees of computer simulation firms, military and defense contractors and hardware and software vendors.

Sharon is group leader for experiments in Argonne's Reactor Engineering Division. He develops software for training nuclear power plant operators.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Exploring uncharted waters

Spencer Gifts develops SIRIS, a \$5 million integrated database system, from scratch

BY JOANIE M. WEXLER
CW STAFF

There's a credo that the best managers are those who work their way up from the trenches, because they understand precisely what their subordinates' jobs entail. Spencer Gifts, Inc. is betting the success of a five-year business overhaul project on that very premise.

With a total of 45 years of retailing experience between them, Spencer's chief executive officer and vice president of information systems are managing their current Spencer Integrated Retail Information System (SIRIS) project with a dose of realism.

CEO John Hacala and Vice President of Information Systems Eugene Murtha say their experience allows them to take an idea and visualize it running through the entire Pleasantville, N.J.-based corporation. That ability helped them conceive and appropriately design SIRIS, an integrated database system aimed at giving buyers and merchandising managers up-to-the-minute information about sales trends.

"I've been a buyer and a merchandising manager, and I understand what information these people need to do their jobs," Hacala explains. "The quicker you can pick up on a trend, the more you can maximize the benefit of that trend."

Hacala gets actively involved with IS planning decisions at the \$260 million specialty retail chain. Spencer Gifts has been owned by MCA, Inc. since 1968 and operates about 550 stores in shopping malls nationwide.

"We have a formal structure for



Spencer Gifts' Hacala (left) and Murtha managed SIRIS' development

keeping John constantly involved," Murtha says. "He is the type of manager who walks around the building and talks to people; he keeps his pulse on everything, including IS."

Hacala's hands-on involvement with IS is "unusual, particularly in the retail industry," according to John Chay, former vice president of IS at the National Retail Federation, Inc., sponsor of the Retail Information Systems Conference (Riscon).

Hacala spoke about Spencer's SIRIS project at Riscon's annual conference in mid-October in St. Louis.

"You'd never hear a CEO say he wasn't going to get involved in site selection or operations, and the computer is another strategic tool," Hacala says. "You don't have to be a hardware or software expert, but you should know the benefits of different kinds of systems and what questions to ask."

Continued on page 56

Perhaps IS needs a dose of perestroika

BY CLINTON WILDER
CW STAFF

Looking for a role model for redesigning your information systems organization to meet user needs? Try the Soviet economy.

That unconventional wisdom comes from Dean Meyer, president of NDMA, Inc., an IS management consultancy in Ridgefield, Conn. Meyer argued that in the spirit of the lifting of the Iron Curtain, some IS departments would do well to emulate *perestroika*, or restructuring.

According to Meyer, "Most IS organizations are run by a central Soviet that determines how time and money will be spent." He added, "It didn't work in Eastern Europe, and it isn't

working in today's corporations."

The IS department should change from a centrally planned economy to a market-driven economy, Meyer said, by giving users more say in what IS services they want and pricing them accordingly.

Implementing chargeback and managing IS as a profit center are important pieces, but they are part of a larger philosophy.

IS activities "should be planned by the customer instead of by the provider," Meyer said. "Then IS will only do what the clients are willing to pay for. The way things work now, we have surpluses [of IS services] in some areas and shortages, or backlogs, in others."

Meyer advocated a process of what he calls shadow budgeting, or distributing the projected IS budget among

users so they each know what they are paying for. To reach that point, the IS department should take steps, including the following:

- Identify the IS department's "product line."
- Identify all suppliers, external and internal.
- Determine a "fair market price" for IS services based on their cost of delivery and what prices are offered in the open market (i.e., by outsourcing vendors).
- Design an invoicing process so users will "start to get a feel for what their decisions cost," Meyer said.

If successful, the process will reinvigorate IS and transform the users from supplicants to "well-informed buyers who want quality," according to Meyer. And perhaps their role models will be the customers at the McDonald's restaurant in Moscow's Red Square.



Compaq introduces
an 8½"×11"
awesome display
of power.

One look at our powerful new notebook PC, and you'll see why more FORTUNE 1000 companies choose COMPAQ portables and laptops over all others.* Now see it in person at your Authorized COMPAQ Computer Dealer.

Call 1-800-231-0900, Operator 138 for the location nearest you.

In Canada, 1-800-263-5868, Operator 138.

COMPAQ

It simply works better.

ACTUAL SIZE

YOU'RE LOOKING AT THE NEW COMPAQ LITE 386s/20 PERSONAL COMPUTER.
THE MOST POWERFUL NOTEBOOK PC ON THE PLANET.

■ YES, IT'S SMALL, BUT
LOOK HOW BIG IT IS
ON THE INSIDE.

■ STORES UP TO
30,000 PAGES.
THE ONLY NOTEBOOK
PC THAT OFFERS
A 90-MB FIXED DISK
DRIVE.



■ VGA DISPLAYS
RAZOR-SHARP
GRAPHICS IN 15
GRAY SHADES.



■ MORE THAN 3
HOURS' BATTERY
LIFE PLUS INTERNAL
FAST CHARGE.

■ ADD A DESKTOP
EXPANSION BASE
FOR MORE OFFICE
CAPABILITY.

■ TRAVEL MUCH? OUR WORLDWIDE
WARRANTY ASSURES SERVICE IN
OVER 60 COUNTRIES.



■ YOU CAN EVEN PLUG IN A MOUSE.

■ THE 20-MHz
INTEL 386SX
PROCESSOR WITH
CACHE SETS YOUR
PRODUCTIVITY
ON FIRE.

■ AT A MORE
7.5 LB. WITH
BATTERY, IT
TRAVELS
LIGHT.

■ THE 2-MB
HIGH-SPEED
RAM IS
EXPANDABLE
TO 10 MB.



CALENDAR

The changing nature of telecommunications vendor/user relationships is the theme of the International Communications Association (ICA) 1991 winter seminar to be held Jan. 13-16 in Houston.

The evolution of outsourcing and global networking partnerships will be covered by speakers from both the user and vendor communities. Speakers from user companies will include Bruce Turkstra of Merrill Lynch & Co., Bud Turner of McKesson Corp. and Woody Randall of Citizens & Southern National Bank. The keynote speaker will be University of Minnesota Prof. James C. Wetherbe.

For more information, contact the ICA in Dallas, Texas at (214) 233-3889.

JAN. 6 - 12

International Security Conference and Exposition West '91. Anaheim, Calif., Jan. 9-11 — Contact: Cahners Exposition Group, Des Plaines, Ill. (708) 299-9311.

Mathematics Conference. San Francisco, Jan. 12-15 — Contact: Maury Kendall, Wolfram Research, Champaign, Ill. (217) 398-0700.

JAN. 13 - 19

Pacific Telecommunications Conference: Accessing the Global Network. Honolulu, Jan. 13-16 — Contact: PTC, Honolulu, Hawaii (808) 941-3789.

National Retail Federation Retail Industry Convention and Exposition. New York, Jan. 13-16 — Contact: NRF Convention Registrar, New York, N.Y. (212) 563-5113.

Technical Conference on the X Window System. Boston, Jan. 14-16 — Contact: MIT Laboratory for Computer Science, Cambridge, Mass. (617) 253-8861.

Telecom Skills Workshops. Waikiki, Hawaii, Jan. 17-18 — Contact: Pacific Telecommunications Council, Honolulu, Hawaii (808) 941-3789.

JAN. 20 - 26

Data Visions '91. San Francisco, Jan. 20-23 — Contact: Earle Speranza, Wordtech Systems, Orinda, Calif. (415) 254-0900.

The Downsizing Conference. San Francisco, Jan. 21-22 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Unix Technical Conference. Dallas, Jan. 21-25 — Contact: Usenix Conference Office, El Toro, Calif. (714) 588-8649.

Infotext '91. Las Vegas, Jan. 22-23 — Contact: Bob Dale, Infotext Publishing, Capistrano Beach, Calif. (714) 493-2434.

Uniform 1991. Dallas, Jan. 22-24 — Contact: Bob Linke, PEMCO, Des Plaines, Ill. (708) 299-3131.

JAN. 27 - FEB. 2

Communication Networks '91 Conference and Exposition. Washington, D.C., Jan. 28-31 — Contact: Michael Sullivan, World Expo Corp., Framingham, Mass. (508) 828-8258.

Network Computing Forum and Exposition. Washington, D.C., Jan. 29-31 — Contact: Christine Krajewski, World Expo Corp., Framingham, Mass. (508) 828-8258.

FEB. 3 - 9

Macapp Conference. Phoenix, Feb. 4-8 — Contact: Macapp Developers Association, Everett, Wash. (206) 252-8445.

Macintosh/N.Y. '91. New York, Feb. 5-7 — Contact: Peter Kimpton, Exposition Management, Waltham, Mass. (617) 290-0412.

Florida Educational Technology Conference. Tampa, Fla., Feb. 5-8 — Contact: Barbara Ann Cox, Office of Educational Technology, Tallahassee, Fla. (904) 488-0980.

NOMDA West Regional Convention. San Diego, Feb. 7-9 — Contact: Katy Dunn, NOMDA, Kansas City, Mo. (816) 941-3100.

FEB. 10 - 16

Video Expo. San Francisco, Feb. 11-15 — Contact: Debbie Rotolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Managing Information Technology when the Going Gets Tough. London, Feb. 12 — Contact: Susy Mayhew, London, England 071 236 4080.

FEB. 17 - 23

Northwest Computer Show. Minneapolis, Feb. 19-20

— Contact: Judy Koch, Plymouth, Minn. (612) 420-5376.

FEB. 24 - MARCH 2

IEEE Conference on Artificial Intelligence Applications. Miami Beach, Fla., Feb. 24-28 — Contact: IEEE Computer Society, Washington, D.C. (202) 371-1013.

Communications Connections (Commconn '91). San Diego, Feb. 25-27 — Contact: Dimensions, Redwood City, Calif. (415) 591-0183.

Sun Open Systems Expo. Boston, Feb. 25-27 — Contact: Sun Open Systems Expo, Austin, Texas (512) 331-7761.

Compeon Spring '91. San Francisco, Feb. 25-March 1 — Contact: Roger Anderson, Livermore, Calif. (415) 422-8572.

EDI and the Law '91. Washington, D.C., Feb. 26-27 — Contact: Data Interchange Standards Association, Alexandria, Va. (703) 548-7005.

Financial Market Data Conference. New York, Feb. 26-27 — Contact: Waters Information Services, Binghamton, N.Y. (607) 772-8086.

Strategic Planning Systems Conference. Tempe, Ariz., Feb. 27-March 1 — Contact: Pete Ashey, Conference Coordinator, Nardoni Associates, Lebanon, N.J. (201) 730-9444.

MARCH 3 - 9

Communication Technologies Conference '91. Washington, D.C., March 6-7 — Contact: Jess Seiple, Technology Interchange Group, Clifton, N.J. (201) 478-3606.

East Coast Oracle User Resource Conference. Washington, D.C., March 6-8 — Contact: Dale Lowery, Oracle User Resource, Washington, D.C. (202) 254-4864.

Open Systems Explained — The Management Issues. London, March 7 — Contact: Susy Mayhew, London, England 071 236 4080.



Would you rather ride with a real pilot?

Networking.
Finding a real expert can make the difference between flying high and landing flat on your face. That's why you need ComputerLand®.

We've designed and installed twice as many single and multi-

vendor networks as our nearest competitor. Over 35,000 of them according to the 1989 LAN

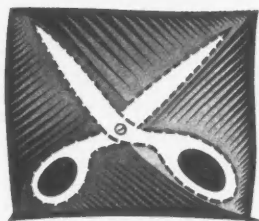
Magazine Annual VAR Survey. And for good reason. You see, ComputerLand

carries products from all the top players in networking, including IBM®, Compaq, Apple®, Novell®, 3Com® and Microsoft®.

We're staffed with hundreds of networking engineers. All certified by ComputerLand. Plus extensively

© 1990 ComputerLand Corporation. IBM, Compaq, Apple, Novell, 3Com and Microsoft are registered trademarks of their respective companies.

CLIPS



Tim Lewis

Summaries from leading scientific and management journals

"The elusive silver lining: How we fail to learn from software development failures"

By Tarek Abdel-Hamid and Stuart Madnick

Sloan Management Review
Fall 1990

■ When software projects go awry, we either hide the mistakes or never discover them. The important lessons to be learned from failures are usually not readily apparent; they need to be extracted from deep within the project experience.

Many managers rely on conventional wisdom to explain failures, such as

Brooks' Law, which says that adding manpower to a late software project delays it further. But reliance on these intuitive explanations may prevent managers from identifying the real problems.

The authors have developed a post-mortem diagnostic tool that simulates the software development and testing process. For example, it can determine whether the project was understaffed or whether quality-assurance testing continued beyond the point of diminishing returns.

The result is a set of ideal cost and schedule estimation benchmarks for the finished project that can be used to improve estimates for future projects. The payoff from an effective postmortem is a smarter organization that truly learns

from its mistakes. — Mitch Betts

"Systems architecture: Identifying strategic strikes"

By Randall Latham

Journal of Systems Management
October 1990

■ "Strategic strikes" are competitive advantages gained through new uses of information technology. However, such advantages are fleeting if the technology can be quickly replicated by the competition.

New strategic strikes can be discovered through systems architecture. Systems architecture involves comprehensive analysis of the company's current and long-term needs and resources. It deals with all aspects of technology — business function, application, data, communications and hardware. Through systems architecture, needs can be anticipated and provided for in advance; it is active rather than reactive. Information technology can thus be more effectively and efficiently employed.

For competitors that are not employing similar analyses, strategic strikes made through this type of planning are more difficult to replicate and neutralize.

The greatest barrier to implementation of systems architecture lies in the resistance of any organization to technological change. The strikes enabled by a well-thought-out systems architecture must be put in place at a rate acceptable to the employees. — Derek Slater

"Why be honest if honesty doesn't pay?"

By Amar Bhidé and Howard Stevenson

Harvard Business Review
September-October 1990

■ Is honesty the best policy? That is a question that has long plagued society, and never more so than now. We know honesty is a moral choice. Most people tell themselves that in the long run, honesty will pay, and those who are dishonest will get their just deserts. But the truth is, there is no evidence to prove such a belief.

In fact, there is greater reason to believe deception pays. For example, in an interview with *Inc.* magazine, Philippe Kahn explained how his firm, Borland International, got off the ground by deceiving an ad salesman for *Byte* magazine. The then-broke company was able to secure good credit terms for an ad by appearing as a busy, venture-backed company. That ad sold \$150,000 worth of software.

As morally conscious people, we hope that when someone cheats, steals or breaks contracts or promises, the result will be alienation. Getting even would seem to satisfy the slighted, but it takes valuable energy to retaliate while incentive for doing so is nonexistent. In other words, it is a good business practice to turn the other cheek.

Given this, we would expect breaches of trust to be rampant, but that's not the case. Businessmen keep their word because they want to, not because honesty pays. It is the absence of predictable financial rewards that makes honesty a quality prized in the business environment, and as long as the rest of us live by this, the system will be fine. — Jodie Naze



Or someone who's still learning to fly?

trained by every one of these top manufacturers.

That's why we know exactly which networking products can and can't work for you. Whether they adhere to industry standards. And whether they have the functionality and compatibility to make your investment

in networking really pay off.

What's more, when it comes to building a network around equipment you've already got in place, nobody's more experienced than ComputerLand.

ComputerLand

Business to business. Person to person.

So don't waste your time or money on someone who still hasn't gotten off the ground.

Call 1-800-852-8043 extension 35 to find the ComputerLand nearest you.

You'll be putting your company in the hands of the real experts.

COMMENTARY

Clinton Wilder

Obfuscating outsourcing



How can you tell when a new direction in information systems management has turned into a full-

fledged trend? The number of conferences, market research studies and consultants specializing in the topic are all good indicators, but best of all is the Buzzword Test.

If a new phenomenon has developed at least five new clichés or buzzwords around it, it can be officially considered a trend. I'm defining buzzword as something that sounds nice when you say it but either oversimplifies an issue to a great degree or goes so far as to hide the truth. Examples are "solutions," "standards," "open systems" and "no new taxes."

Well, outsourcing has officially passed the Buzzword Test.

I'm not sure exactly when this occurred or what particular press release put it over the top, but what follows is one observer's annotated list of the Current Five Greatest Outsourcing Cliches — culled from the ranks of companies who have outsourced some or all of their IS operations. This is not a criticism of the trend, which has been and will continue to be used very effectively by many firms. Just consider it a vote for telling it like it is.

This arrives just in time for the holiday season. Watch for the sequel next summer.

1. **"We're in the widget business, not the data processing business. So it makes strategic sense to focus on widgets and let the DP experts [outsourcing vendor] worry about DP."**

This may be true if you're talking only about fairly mundane data center operations. But if you mean large pieces of applications development and strategic IS planning, doesn't this fly in the face of integrating IS with the business instead of relegating it to traditional back-office status?

2. (corollary to #1) **"We wouldn't outsource if we were in an information-in-**

tensive business like airline reservations. But our business is making a better widget; worrying about computers is not a strategic focus for us."

Hoo boy, are these guys missing the point. There is not a business on earth that does not rely on information. Many of the most impressive leaders in the use of IS — Benetton, Frito-Lay, Du Pont, Otis Elevator, Wal-Mart Stores — are not in the traditional "information business" — or are they? They have made information strategic in their respective industries and have proven that you don't have to be Dun & Bradstreet or Covia to do so.

That doesn't mean outsourcing and strategic information use are mutually exclusive. At a recent Profit-Oriented Systems Planning Program conference, H. J. Heinz IS consultant Phil Lichtenfels took issue with a previous speaker's slide that implied outsourcing was more appropriate to noninformation businesses. "Information is important to all companies," he said. Heinz has outsourced IS operations to Genix.

3. **"Our IS employees clearly don't have much of a career path in the widget**

industry. We think they'll be very excited to transfer to the outsourcing vendor and have the opportunity to advance in their own field."

This particularly bothersome idea comes after all the talk about how IS technologists must better understand their company's business and feel like they really do work for Wiggins, Inc. and not for IBM. It sure sounds like the old, "we'll worry about the business, you go play with your Cobol and DASD" to me. And then they wonder why systems don't meet business needs.

Transferring employees to the outsourcing vendor is tough stuff. Uncertainty, clashing corporate cultures, new bosses and a highly productive rumor mill will be constantly battering morale. To make it work, management had better be sensitive to the above concerns, not thinking that they're doing their IS employees a big career advancement favor — especially the IS director who gets the new title of "vendor liaison."

4. **"We're looking forward to this relationship with our strategic partner."**

I've addressed this one in this space before. Maybe it's just

semantics, but the bottom line is that outsourcing is a vendor/customer relationship: One party is paying the other for services. Can it be nonadversarial, cooperative and beneficial to both parties? Yes, absolutely. But never forget that your "partner" is in the outsourcing business to make money.

5. **"The outsourcing vendor's resources will give us access to the latest state-of-the-art technology."**

If you're easily wowed by the latest and greatest MIPS cruncher, it's no wonder you thought your IS wasn't up to snuff and you wanted to outsource. State-of-the-art technology can help, but it's the use of the information that makes the difference.

You may have noticed that not one of these five themes mentions the cost savings of outsourcing. That's because it's not a buzzword — it's usually the truth. In these recessionary times, I would think more companies would want to highlight that. But many would rather keep mum about the money, since there are so many trendy buzzwords available.

Wilder is *Computerworld's* senior editor, management.

Uncharted

FROM PAGE 51

Hacala "prods and provokes his managers to gain the necessary knowledge to use IS strategically," Chay says. "Usually, the process is the reverse."

About 500 of Spencer's decision makers, including buyers, merchandising managers, distributors and other managers, will have access to SIRIS. The system's goal is to provide one updated copy of corporate information by continually polling individual personal computers at each store and integrating the information into the corporate relational database. The firm can then monitor sales trends for a few days and project a year's worth of sales for an item.

"If a [supplier's] factory can produce just 20,000 items a week and we order 100,000 units, we effectively lock up the sales of that item if we're quick," Hacala says.

Phase one of SIRIS includes a purchase order management system, merchandising controls and a system that allows buyers to track their spending money. It is set to go live in early January.

Phase two will include an automatic item reordering and distribution system and other operational systems. It will take another two years to complete.

The \$5 million SIRIS project required a heavy investment in educating the IS staff about IBM's DB2 relational database system and Must Software In-

ternational, Inc.'s Nomad fourth-generation language (4GL) tool. "The staff also had to learn how to work in a new MIS/user relationship environment," Murtha says.

SIRIS has been under way for three years, and Murtha estimates that the firm has spent \$100,000 to \$150,000 in outside classes and in-house training for the 80-person IS staff. "We didn't expect our staff to work miracles," he says. "When we conceived SIRIS, there were no development tools available for DB2." So the company developed its own set of database management tools and is positioning itself to sell them and SIRIS itself.

Murtha notes that a couple of the staffers who were initially chosen for the SIRIS team "were enamored with their old ways" and elected to leave the firm rather than invest the time and effort in gaining necessary technical skills for the 4GL development that the project demanded.

Those on the SIRIS team "didn't know the swamp was there, and the bridge was washed out," Hacala says. He describes SIRIS as "a real Lewis and Clark expedition," which involved designing the database, writing code, converting existing data to the new system, testing the database and producing documentation.

In addition, Hacala and Murtha created an all-or-nothing incentive program for SIRIS developers. If the team delivered

on time, staffers would receive 10% to 25% of their salary as a bonus — depending on position. The project came in on time, the executives say, because in part of "recognizing quality people."

SIRIS should also help Spencer Gifts help administrative head count down. SIRIS will initially provide new point-of-sale software to reduce paperwork and allow more administrative tasks to be performed electronically at the individual stores.

"The home office will need fewer people to handle batch reports," Murtha says. "When you're hiring 8,000 employees at Christmastime, that's a lot of payroll information that previously had to be delivered on paper to human resources and processed."

The last generation

Spencer Gifts may be leading edge in designing retail systems for business benefit, but the company does not claim to be leading edge in technology. Hacala prefers to go with "the last generation of technology. It'll do 85% to 95% of what the new generation will do, and it's a hell of a lot cheaper."

For example, Spencer currently houses an IBM 3081K mainframe in its headquarters, and SIRIS "will be a real resource hog," Murtha says. But Hacala figures that once IBM's new-generation Enterprise System/9000 mainframes start shipping in droves, he'll be able to pick up a 3090 for a comparative song.

SIRIS-ly speaking

Projects with narcissistic origins can sometimes snowball into unexpected business opportunities. When Spencer Gifts began to develop its SIRIS around IBM's DB2 relational database, it discovered that there were no commercially available development tools that were both DB2- and specialty-store-oriented. So the firm developed its own.

Now, Spencer is looking to commercially market the development tools in a joint venture with Must Software, vendor of the Nomad 4GL that Spencer's used to develop its Development Management Tools (DMT). Spencer also plans to market SIRIS itself. SIRIS is being designed, however, specifically to allow Spencer to integrate sales trends and other key information from the firm's 550 nationwide specialty chain stores.

While Spencer Vice President of Information Services Eugene Murtha emphasizes that "we're not getting into software as a primary business," he notes that "at least five or six parties" are interested in the DMT package. Murtha describes DMT as a "utility that administers and supports DB2 and also enables some productivity gains in computer operations."

He says that "the situation is sort of analogous to how American Airlines' reservation system came to be a separate business. But this is uncommon in retailing and is an aside for us." Bill Buoni, the IS design consultant who helped develop DMT and SIRIS, will lead the team of several programming consultants to do most of the commercial support for DMT.

"While whatever revenues we take in will be considered gravy, they will help start the payback on our investment in SIRIS and training," Murtha acknowledges.

Buoni and Must Software will handle the DMT marketing and packaging, and Spencer will receive an as-yet-unnegotiated royalty.

JOANIE M. WEXLER

Murtha also points to Spencer's recent purchase of now-discontinued portable Epson America, Inc. PCs with integrated modems for its buyers.

"We've quadrupled our processing capacity but are paying less in equipment leases than we were five years ago," Hacala says.

digital update

NEWS AND VIEWS NOVEMBER 1990

Evaluating Workstation Performance: It's a Question of BALANCE

If you were to try to pick a triathlon winner, would you go with the best marathoner? The champion bicycle racer? The Olympic swimmer? Or would you choose the athlete known for being very good overall? The smart money is riding on the all-around athlete known for turning in a *balanced performance*.

Think about how this applies to your work. Say you're wrestling with a workstation purchase decision. You're dazzled by all of the performance claims you've seen and heard. To pick a winner, do you choose the machine with the highest integer or floating-point MIPS rating? Or the machine with blazing graphics performance? And what about I/O speed? Which is more important?

The answer: they're *all* important. You're not buying a CPU chip, or even a graphics accelerator. You're buying a *system*. It's the *total system*, with all of its attributes, that determines whether the machine will be the best performer for the jobs you need done.

How to Identify the Balanced Performer

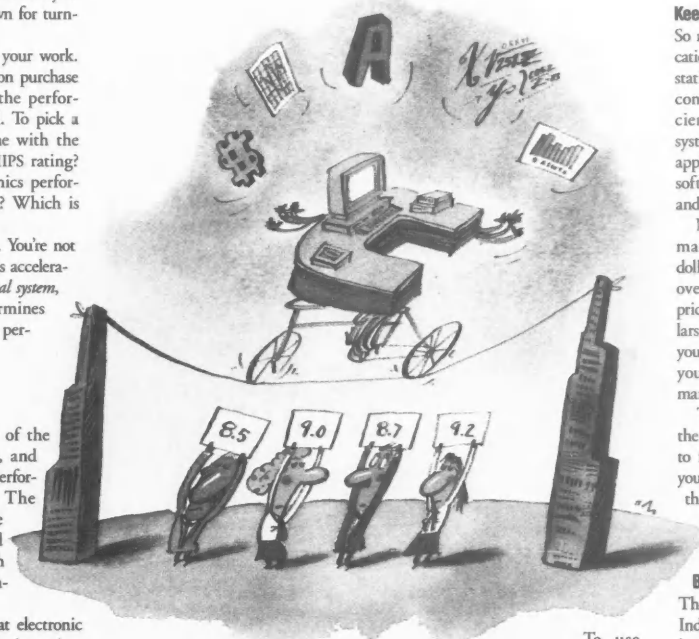
As an example, let's look at a few of the applications you may want to run, and how the different aspects of system performance affect the applications. The following chart shows five typical workstation applications and the approximate degree to which each is dependent on CPU, I/O, and graphics performance.

From this chart, you can see that electronic publishing applications are graphics intensive, CASE applications are CPU intensive, and mechanical and electronic design applications are both graphics and CPU intensive. Business and financial modeling applications, because of their reliance on database access, are extremely I/O intensive.

APPLICATION PERFORMANCE MIX

Application	CPU	I/O	Graphics
Business/Financial Modeling	20%	60%	20%
CASE	60%	20%	20%
Electronic Design	30%	20%	50%
Electronic Publishing	20%	20%	60%
Mechanical Design/MCAE	40%	20%	40%

Percentages represent averages of ranges.



To use these numbers in your workstation decision, you'll need to factor them against known performance figures for the workstations you're considering. Different applications will produce different run times based on their performance mix and the specifications of the tested workstations.

Now you've got data that shows how *individual* applications perform on different systems you're considering. But in the real world, you don't use a workstation to run a single application. Most likely, you'll run a set of related tools, and in many cases, you'll be running them *at the same time*.

This introduces a new selection criteria, because multitasking places significant demands on operating system efficiency, especially in terms of task scheduling. An efficient, mature operating system will allocate CPU resources to the competing applications and keep all of them running smoothly. Less mature operating systems

can cause some applications to bog down, or even stall; graphics may be slow or choppy; CPU-intensive jobs can become severely I/O bound.

Keeping a "Total System" Perspective

So now you've evaluated how two or three applications run individually on your potential workstations. You've tested the applications running concurrently to judge operating system efficiency. And you've certainly looked at the systems in terms of your own unique needs—applications; industry standards for hardware, software, and communications; the availability and quality of post-sale service and support.

Next you arrive at the big question: Which machine offers better value for your dollar? Based on what you've just learned about overall balanced performance, do traditional price/performance measures really count? Is dollars per MIPS a valid measure on which to base your decision? Or are you better off developing your own measure that judges *system* performance?

The point of this exercise is to demonstrate the need to take a *total system* view, as opposed to focusing on certain system attributes. When you evaluate systems, you need to look closely at the job at hand (and the applications you'll be running), and evaluate systems based on actual working conditions.

Be an Informed Consumer

There are tools to help you in your evaluation. Industry-standard benchmark tests are useful, but be aware that even these are limited. Current SPECmark tests, for example, measure only integer and floating-point performance—basically raw CPU performance. (In the near future, SPEC tests will cover CPU, I/O, and multiuser performance.) The X11perf test is an accepted measure of graphics performance. Remember, these are all single-stream tests that do not measure operating system efficiencies. You'll have to do that yourself—with your own set of applications running in your environment.

All vendors seek to present the most attractive aspects of their workstation products. Take the performance claims for what they're worth—as indicators of specific system capabilities. Your questions should be: Are these performance specifications relevant to my job? What about next week? Or next year?

In today's changing business environment, a system with balanced performance will stand the test of time.

STRAIGHT TALK

ON

VAX and VMS

With the October introduction of new VAX, MicroVAX, and VAXstation products, Digital set forth new directions for VAX and VMS. The focus of this recent announcement was on enhancing VMS openness via standards as well as enhancing VAX performance and price/performance.

Speaking directly to you, our customers, William Demmer, Vice President of the VAX VMS Systems and Servers Group, answers questions designed to offer further insight into the strategies at work behind this very important announcement.

Question: Can you explain the new VMS statements of direction?

William Demmer: We have presented our intention to further open VMS with the incorporation of X/Open Branding, POSIX, and Open Software Foundation (OSF) standards.

Digital, along with most standards organizations, defines the benefits of open computing in two ways: ease of interoperating our products with other vendors' systems, and ease of moving or porting applications to other vendors' systems.

Thanks to our Network Application Support (NAS) program, we believe that VMS-based systems already lead the industry in ease of interoperating with other vendors' systems—from MS-DOS-based PCs to Apple Macintosh systems, UNIX workstations, IBM mainframes, and CRAY supercomputers.

Recently, we detailed our plans to enhance VMS applications portability, also through the NAS program. We believe that the key to portability is standards—not standard operating systems, but standard interfaces.

NAS, as you may know, is Digital's program for delivering these standard interfaces. Over the years, as part of the NAS program, we have added a variety of standards to VMS, such as SQL and the X Window System. Now we intend to add two additional key standard interfaces to VMS—making it an open operating system in the eyes of the world's key standards bodies and making it easier for you to implement an open computing environment with VMS.

"Digital is committed to protecting your investment in VAX and VMS—now and well into the future."

William Demmer
Vice President
VAX VMS Systems
and Servers Group



X/Open Branding, POSIX, and OSF standards will make it easier to port most UNIX applications to VMS. This means you will have the tremendous functional advantages of VMS with dramatically new levels of portability.

Question: What X/Open, POSIX, and OSF standards will be incorporated into VMS, and when will they be available?

William Demmer: As I've just mentioned, we have already added a variety of standards to VMS. Other standards are forthcoming, including OSI and OSF/Motif.

In addition, we have previously described our intention to add the first IEEE POSIX standard (1003.1) to VMS. Now we have announced our intention to add all defined POSIX standards (1003.1, 1003.2, 1003.4). All

three will go to field test next quarter and be delivered in 1991.

As you are no doubt aware, X/Open and the Open Software Foundation (OSF) are both non-profit organizations developing widely accepted specifications for open systems. X/Open's Portability Guide (XPG) and OSF's Distributed Computing Environment (DCE) describe environments built upon standard interfaces and designed for open computing. We have announced our intention to provide extensive support for many of these standards. We also intend to add many of the OSF/DCE standards to VMS. Digital has, in fact, already donated four of the eight technologies chosen by OSF to compose the DCE.

We have already added key X/Open standards to VMS, including SQL, FORTRAN, Pascal, C, ADA, and the X Window System. Now we intend to add the other necessary components of XPG3 to VMS in order to receive X/Open Base System Branding.

Until now, the only software systems which have been XPG3 branded are UNIX systems, including Digital's ULTRIX, IBM AIX, and HP UX. XPG3 branding for VAX/VMS will dramatically level the playing field for VMS in terms of openness.

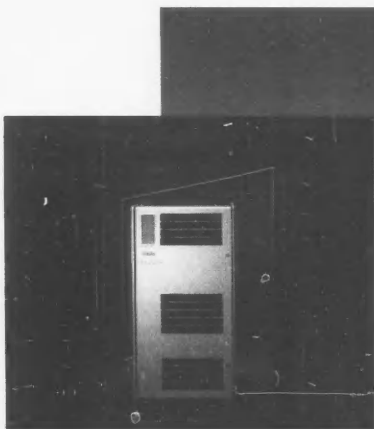
Question: Why are you adding these capabilities to VMS?

William Demmer: We are opening VMS for several reasons.

First, you have asked for it. You have always liked the functionality and leadership multi-vendor integration capabilities of VMS. Now, enhanced openness will bring even more flexibility to your VAX system investments.

Secondly, today there are thousands of Digital applications for VMS-based VAX systems. By opening VMS, hundreds of emerging new applications originally written for UNIX-based systems can be added to the list. Using POSIX and XPG3 portability features, you will be able to mix and match hardware to the requirements of a specific application or project—and not have to worry about rewriting or retraining. For example, many applications written initially to run under UNIX will be usable in projects requiring the greater data integrity and security that VMS provides via clustering, disk shadowing, automatic system and device failover, and data journaling.

VMS



"We'll utilize the best available technologies to enhance VAX performance and price/performance."

Question: If VMS is open, what unique advantages will it offer?

William Demmer: Besides bringing new levels of openness and portability to Digital-based computing, VMS will continue to offer the same unique advantages—data dependability and high availability, networking capabilities, and superior multivendor support. Not to mention over 10,000 superior applications, plus tools designed to cut software development time in half.

From the first VAX to the VAX systems of the next century, VMS will always support compatible system growth, from desktop to data center, without rewriting software. That translates into investment protection for you.

Question: What are the new statements of direction for VAX computers?

William Demmer: In terms of VAX system capabilities, we will be utilizing the best available technologies to enhance VAX performance and price/performance, as we have been doing ever since the VAX was introduced.

Specifically, we will be phasing in high-performance RISC technology to further accelerate VAX performance. Today's major I/O performance gains in the VAX 6000 Model 500 are made possible by new RISC I/O technology, which we have also recently incorporated into the new VAX 4000 and VAX 9000.

We also plan to incorporate leadership RISC CPU technology into VAX systems over the next two to three years. VAX/VMS systems based on RISC will be compatible with today's VAX/VMS systems.

Question: Are we looking at a major shift in VAX and VMS strategy?

William Demmer: No. VAX and VMS are based on hardware and software architectures that are inherently designed for growth. We're always adding additional features to VMS. We're also continually moving the VAX hardware architecture to high-performing technologies—from ECL to CMOS, and now to RISC.

We've often stated our commitment to improving VMS software, as well as moving VAX hardware to better performance platforms.

Consequently, it should not be a major surprise when Digital announces its intention to further enhance these extremely feature-rich hardware and software technologies. You should continue to understand that Digital is committed to protecting your VAX investment now and well into the future. This recent announcement offers further proof of that.

Question: How does this affect Digital's plans for future RISC/UNIX developments with the DECsystem product family?

William Demmer: Our commitment, as always, is to offer leadership in products and technology.

Our DECsystem products have brought leading RISC/UNIX capabilities to desktop computing, graphics, and servers. We're now expanding that leadership tack to our VAX/VMS products.

At the same time, DECsystem products, based on MIPS technology, will continue to bring price/performance advantages to the UNIX environment.

Just as important, through NAS we are able to provide you with these price/performance benefits in a unified computing environment—one that includes all Digital systems and systems from other major vendors.

Question: What do these new directions for VAX and VMS mean for Digital?

William Demmer: We believe that this continued acceleration of VAX hardware and VMS software enhancements clearly surpasses the competition—putting us in a very strong position for the remainder of the decade, and beyond.

You are already familiar with the benefits of VAX and VMS and can easily appreciate the added performance available with the new VAX 6000, MicroVAX 3100, and VAXstation systems. I believe you'll applaud a move that brings more openness to VMS and enhanced performance to VAX.



In Case You Missed the News: New, Higher Performance VAX, MicroVAX and VAXstation Products Announced

Here's a quick recap of these new products (plus some impressive performance figures):

VAX 6000 Model 500 Series

The new VAX 6000 Model 500 series offers up to 100 percent more performance than the Model 400 series—for only a 16 to 18 percent higher price. It spans the performance range from 13 to 72 VUPs. The VAX 6000 Model 500 has triple the I/O performance and twice the memory of previous VAX 6000 models. Storage capacity has been boosted to over 5 Terabytes. Modular design allows you to upgrade existing VAX 6000 systems to these new performance levels within the same system cabinet. (We also reduced the price of the VAX 6000



Model 310 and VAX 6000 Model 410 systems by 23 to 30 percent. This marks a major price/performance gain for two of our most popular and successful VAX products.)

MicroVAX 3100 Systems

We boosted the performance of our MicroVAX 3100 with two new models—the Model 10e and Model 20e.

Both offer you 45 percent more performance, with no price increase over the previous models. These new MicroVAX systems now can support up to 40 users for the price of a PC.

VAXstation 3100 System

In our VAXstation family, we announced the new VAXstation 3100 Model 76, which almost doubles the performance of the previous top-of-the-line VAXstation 3100 Models 38/48.

PRODUCT FOCUS

Here is some news you can use on Digital storage products and programs:

KDM70 XMI Controller Does It All

The KDM70 XMI storage controller is Digital's most powerful single-host controller. It provides Digital Storage Architecture (DSA) devices with high-speed access to XMI-based VAX 6000 client/server systems and VAX 9000 production systems. The KDM70 underscores the benefits of DSA by providing the latest advanced technology supported by the entire range of RA series disk drives and TA series tape drives.

Powered by an on-board CVAX microprocessor, the KDM70 controller features two data channels and eight ports, with the capability of simultaneously supporting a mix of disks and tapes. The two channels are dynamically allocated to the eight ports for optimum I/O performance, making the KDM70 the only DSA controller that allows devices to operate in parallel at the maximum speed of the controller. The

KDM70 can service up to 1,200 I/O requests per second and sustain data rates of 34 MB per second to support two spiraling RA92 disks, and 4.0 MB per second for two ESE20 disks. This also makes the KDM70 our fastest and most versatile single-host controller.

Comparison Notes on the KDM70

When compared to the KDB50/BI-based controller, the KDM70 is approximately three times more expensive, but provides twice as many ports, delivers almost six times more performance, and connects directly to the XMI bus.

When compared to the HSC40/CI-based storage server, the KDM70 is approximately one-third the price, requires no additional floor space, provides 25 percent fewer ports, and delivers similar performance while reducing I/O traffic on the CI bus.

Fastest Disk Just Got Faster

Our fastest solid state disk, the ESE20, now provides up to 1,200 I/O requests-per-second throughput when used with the KDM70 disk controller. Quadrupling the current ESE20 solid state disk performance, the device-level access time decreased from 1.3 ms to near zero. The increased speed of the ESE20 balances the increased processing speeds of the VAX 6000 and VAX 9000.



New RA Disk for All Storage Arrays

The new RA92 disk drive provides a 25 percent increase in capacity and 10 percent higher performance over the RA90—at a lower price per megabyte.

It is featured in the SA800 and SA850 storage arrays, and it is also supported in all existing SA600, SA650, and 40-inch RA90 cabinets. It plugs right into current HSCs and other DSA/SDI controllers without interrupting system operations and without needing to change either system or application software.

The RA92 allows the SA800 storage array to configure up to 12 GB of usable storage in 5.5 square feet of floor space. Capacity isn't the only metric by which the RA92 excels. With a 16 ms average seek time, and a transfer rate of up to 2.8 MB per second, the RA92 is a high-end disk that ranks with industry leaders.

News on Tape

At \$1,800, Digital's new 525 MB TZK10 quarter-inch cartridge (QIC) tape drive offers leadership price, capacity, and performance in low-cost back-up. This industry-standard QIC drive is designed to provide unattended back-up for entry-level systems, and it's available now to support the new DECsystem 5100 systems.

Complementing the new TZK10 tape drive is the 1.2 GB TLZ04 tape drive. Now available across a wide range of ULTRIX and VMS-based systems and servers, the TLZ04 drive's formatted transfer rate of 170 KB per second can complete back-up of a gigabyte of data in less than 2 1/2 hours.

RA8X Migration Program: Save More, Worry Less

The popular RA8X Migration Program has been enhanced to include the latest storage products. If you have RA80, RA81, RA82, or SA482 series disk drives, you can now significantly reduce operating costs by upgrading to the newer RA92, SA70-JK (RA70 4-pack), SA800, or SA850.

Substantial savings begin "up-front" through the use of generous allowances on your existing RA8X series drives. You can receive \$6,000 for either one RA82 or two RA81/RA80 drives toward one of the new RA92, SA800, or SA850 storage configurations. There's no limit on the number of trade-ins. You could, for instance, trade in 16 RA82 or 32 RA81 drives for a new SA800-LA, and receive a hefty \$96,000 allowance towards the purchase—all after applying your DBA (Digital Business Agreement) discount.

In addition to these generous allowances, you will realize substantial long-term savings in floor space utilization, power consumption, HSC ports, and maintenance charges.

Additional program features include comprehensive migration planning services, de-installation and removal of the old equipment, installation of new equipment, and installation of any related storage products that are purchased at the same time—all at no extra charge.

Trade-in values are subject to periodic updates, so call your Digital sales representative for more details, or call our Technical Consulting Center at 800-343-4040 and reference the RA8X Migration Program.

Remember you can use our fast, easy, direct connections for ordering and information on these and other Digital storage products and services. Call 800-DIGITAL (800-344-4825), or log in to The Electronic Store (800-234-1998 at 1200/2400 baud).

EXECUTIVE REPORT

THE STAFFING OUTLOOK FOR IS

The rising value of versatility

BY ALAN RADDING

Patricia Gilmore believes in being ready for any situation. "My aim has always been to have a staff that can program on anything for anything," she says.

That philosophy has been put to the test in recent months at Coleman Co., where Gilmore is director of MIS. Making do with less has become a way of life at the Wichita, Kan.-based sporting goods manufacturer since a leveraged buyout led to across-the-board staff reductions, including a 59% cut in the information systems staff.

The reductions came at a critical time for the IS department, Gilmore says. The company is on the verge of a major shift to personal computers and PC networks — a move that's in the budget for 1991.

Because she can't count on adding staff or even acquiring new tools during this period of extreme belt-tightening, Gilmore is depending on her existing staff to perform in a dramatically changed working environment. "Everyone's job is changing a lot," she says. "There will be fewer people in IS operations and more PC support and LAN support." Programmers who previously worked on the mainframe systems will now be doing PC applications, too.

Gilmore says she is confident that her remaining staff will rise to these challenges, chiefly because adaptability has always been one of her main hiring criteria. She has made a point, she says, of seeking people with a strong grasp of systems methodologies and changing technologies, steering clear of specialists and, instead, hiring graduates from four-year, degree-granting computer science programs.

Coleman's situation is far from the exception. Companies everywhere are either tightening their belts or trying to get



Bob Barrett

Coleman's Gilmore hires on the basis of adaptability

into condition in case that need arises. The impact of this new emphasis on trimmed-down fitness is being felt in IS, as it is in every other department. At the same time, new technologies are pushing both high-level computing and IS staffs deeper into business areas.

As a result of these dual pressures, U.S. business and the IS function are both going through periods of transition. Unfortunately, it is easier to distinguish what is being left behind than where these trends are all heading.

It is an oversimplification to say IS is changing from the centralized mainframe to distributed PCs and that staff members should prepare to shift their skills and focus accordingly. "In some companies, that is happening, but not everywhere. There

is no one answer," says Steve Joffe, vice president at Paramus, N.J.-based Source EDP.

At Spalding Worldwide Sports in Chicopee, Mass., a number of changes are already under way. The focus of development is shifting away from Cobol, says Bard White, Spalding's director of MIS. Instead, the company is "bringing in more commercial packages and doing more client/server stuff on a PC."

Everyone on the systems staff is required to learn PCs, DOS and PC packages, he says, and telecommunications and networking skills are in heavier demand than ever before.

But these changes don't mean that traditional mainframe-oriented Cobol programmers are going to find themselves suddenly stuck with obsolete skills. Up-

keep of existing Cobol code will provide work for a long time to come. Furthermore, there are many large companies that are far from ready to make a wholesale switch.

Burlington Industries in Greensboro, N.C., isn't ready for a big move, even though the company is moving toward a more diversified mixture of platforms.

"We need to go from the PC to the midrange to the mainframe. Networking, particularly local-area networking, is growing in importance," says E. Ritchie Fishburne, director of corporate IS. That's only part of the picture, however. "We also have 20-plus years of programming in place and need people to maintain those systems," Fishburne says.

Adaptability an asset

At many places, the major change will be that, like Gilmore, IS managers will soon place more emphasis on adaptability as a job qualification. According to Thomas Lodahl, chairman of Cognitech Services Corp., an Easton, Conn., consulting firm that deals with IS-related human resources issues, Cobol programmers of the future will need to know computer-aided software engineering, C, C++, object-oriented programming and Unix, and they will have to deal with core systems in which network hooks are as important as the basic code.

Even companies that are moving in the direction of mainframes for the first time aren't planning to settle for plain vanilla mainframe programming skills.

Highland Superstores, Inc., a 100-store consumer electronics chain based in Plymouth, Mich., is converting from an IBM System/38 to a mainframe to accommodate its rapid growth. Highland is seeking programmers who understand DB2 and SQL and are capable of functioning as business analysts, says George Buick, vice president of distribution, warehousing and IS.

It is not just the hiring
Continued on page 64

INSIDE

Harnessing team power

Page 65

Observations of an occasional employee

Page 68

Radding is a free-lance writer based in Newton, Mass.

IBM lets the Now 486 technology

Without the proper venue, dazzling ability often falls short of expectations. That's certainly been the case with the Intel 486™ microprocessor, a processor that hasn't been utilized to its full potential. So that's what IBM set out to do. Just as it takes a seasoned jockey to turn a thoroughbred into a champion, it took IBM to give the 486 processor every opportunity to work its genius. Introducing IBM Personal System/2® Model 90 XP 486 and Model 95 XP 486.

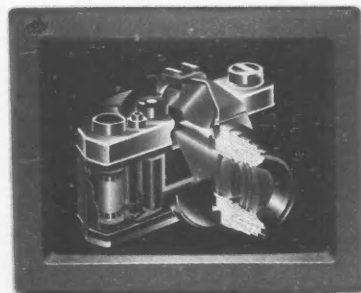
From speed and storage capacity to graphics capabilities and upgradability, the new PS/2® Models 90 and 95 are designed to optimize the power of the Intel 486 processor and deliver a truly balanced performance—equipping you with solutions for today, and providing a platform of growth for tomorrow.

THE 90'S ARE A POWERFUL BREED.

Right out of the starting gate, the Models 90 and 95 will astound you with their power and sophistication. Featuring a 33 MHz processor and a 25 MHz processor that's easily upgraded to 33 MHz, they deliver blazing speed and balanced performance, expanding your capacity for computer-intensive applications like CAD/CAM, financial modeling and multimedia. The course between your data and your processing has also been strengthened—the Micro Channel™ 32-bit data path, combined with a lightning-quick data-transfer rate, not only optimizes the present power of the 486 processor by feeding it a steady stream of information, but also provides for processor

enhancements and will allow you to benefit from advanced operating systems to come. Plus these other innovations: a wider 64-bit data path which optimizes the 486 processor's access to system memory; 4MB memory standard

(expandable to 32MB); and a 256KB cache option for even greater speed. All in all, it's easy to see how the concept of computer “power” has been enhanced, and how IBM helps you take full advantage of every second of computing time.



BRILLIANCE ON DISPLAY.

With increased power comes increased capabilities—the most visually stunning of which is Extended Graphics Array (XGA), standard on the PS/2 Models 90 and 95, and the heart of IBM's spectacular new display presentation.

With high resolution (1,024 x 768 pels) and execution that's significantly faster than VGA, XGA's sharper, clearer picture, coupled with the IBM 8515 color display, gives you swifter performance in windowed environments, and provides graphics-intensive applications such as desktop



horses run. realizes its full potential.

publishing, image processing and engineering design with a stunning new look.

FAST TIMES ARE IN STORE.

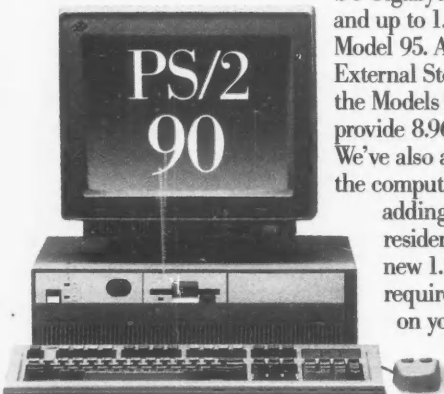
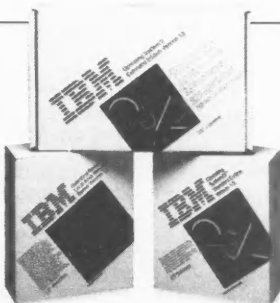
To satisfy even the most demanding storage needs, from LAN systems to data base management to numeric-intensive applications like financial analysis and modeling, IBM has one of the most advanced solutions available. IBM's super-fast SCSI hard disks are pure state-of-the-art performers. With additional hardfile expansion bays, the

PS/2 Models 90 and 95 have enormous storage potential—up to .96 Gigabytes on the Model 90 and up to 1.6GB on the Model 95. And with the PS/2 External Storage Enclosures, the Models 90 and 95 can provide 8.96GB and more. We've also augmented the computing power by adding more flexibility to resident memory—our new 1.3 version of OS/2® requires as little as 2MB on your system. With this streamlined

version you not only get more room for applications, but some users will experience a substantial performance increase in system functions as well. So when you need to make great strides with your computing power, you can count on IBM to give you terrific storage capability wherever you may need it.

DESIGNED TO KEEP YOU OUT IN FRONT.

For the turns and hurdles ahead, you'll need technology that has foresight built in. Through a unique design, the Expandable Processor (XP) allows for an architected family of upgradable processor enhancements that can extend the life



Features	IBM PS/2 Model 90	IBM PS/2 Model 95
Microprocessor		
Standard	80486	80486
Clock speed	25-33 MHZ	25-33 MHZ
Optional upgrade	33 MHZ	33 MHZ
Memory		
Standard	4MB (70ns)	4MB (70ns)
Maximum	32MB	32MB
Integrated Functions	Extended Graphics Array (XGA) and display port, dual DMA serial ports, DMA parallel port, pointing device port, keyboard port, diskette controller support for three drives, SCSI adapter with Cache.	
Fixed Disk Storage		
Standard	80-320MB	160MB-320MB
Display Modes	XGA (includes all VGA modes) 640 x 480 x 256 colors/ 64 gray shades; 1024 x 768 x 16 colors/gray shades; hardware support for 132 column text mode; 16-bit direct color mode at 640 x 480 x 64K colors	
Available Expansion Slots	three 32-bit	six 32-bit
Bus Architecture		
Data path	MCA 32-bit	MCA 32-bit

of your system. With Micro Channel busmaster adapters, you can incorporate multiple processors—like adding “computers” to your computer. And coupled with the industry-standard Small Computer System Interface (SCSI), you'll be able to support new applications and continue to build on your system as your needs become more varied and complex.

With optimized performance in balance, power, speed and adaptability, the new PS/2 Models 90 and 95 are designed to keep you ahead of the pack. To find out more about the new leader in 486 computing, contact your IBM Authorized Remarketer or IBM marketing representative. For a remarketer near you, call 1 800 272-3438.

How're you
going to do it?
PS/2 it!

IBM

Continued from page 61

expectations that are changing: so are the settings in which IS staff members can expect to work. Although head counts in many central IS departments are flat or shrinking, overall demand for IS professionals is not diminishing as much as those figures and all the talk about user programming would indicate.

Instead, IS staffs only seem to be getting smaller because IS professionals are being drawn into business areas.

"LANs and PCs are pushing IS professionals into the user groups," Joffe says. Furthermore, many consultants and recruiters say that when these systems professionals become entrenched in business areas, they may become harder to identify because of title shifts that de-emphasize their technical orientation and emphasize their support function. A systems analyst assigned to a marketing department may, for example, wind up carrying a business card that says "marketing analyst."

And that's not even the farthest reach of the integration trend. J. Daniel Couger, professor of IS and management science at the University of Colorado in Colorado Springs, says many IS professionals are now being hired directly into business departments. More than half of Couger's last graduating class took that route, he says.

It is true that some users are beginning to perform functions that used to belong to IS professionals, but most observers say

this is a case of cooperation, not replacement.

If you are concerned about efficiency, it makes no sense to have users operating on their own, Buick says. It's true, he adds, that "if you have an astute user, he can use SQL to query the database on his own." The question is whether you really want him to. Buick says he thinks not: "It sucks up cycles if you let the users run amok." Instead, Highland channels requests through its IS analysts, who use the same advanced tools to "knock out the requests four to five times faster," he reports.

The increase in educated requests from users who could do for themselves in a pinch is one reason why demand is expanding so rapidly for technically skilled analysts. By the end of the century, this job category will be growing at a faster annual rate (72%) than that of programmers (60%), in part because of the broader scope of the analyst function, says Brenda Wallace, an economist at the U.S. Bureau of Labor Statistics.

These projections represent the continuation of a trend that has already begun, says Richard Wonder, national director at the IS Division of Robert Half International, Inc. in Menlo Park, Calif. — "a collapsing of functions, with more programmer/analysts than pure programmers or pure analysts," he says.

This new breed of programmer/analyst, Wonder says, will write code where necessary, do

systems analysis and write documentation, aided by new tools that accommodate this combination of jobs.

Wonder is most worried about the pure coder who has no experience with or interest in higher-level languages or business issues. "The ones who should be most concerned are Cobol programmers without any business skills," he says.

Joffe, however, says that the person who should be most concerned is the nontechnical analyst — one who does not have programming skills at any level. For individuals of this type, he says, the handwriting is on the wall: "He'd better become technical or become a user."

IS shops are already looking for interdisciplinary types. "I need someone who is not afraid to code but is also not afraid to do analysis," says Steve Crasper, manager of systems development at Kendall Healthcare Products Co. in Mansfield, Mass. Crasper can usually find one or the other, he says, but the combination is hard to come by.

"Technical skills are a given. We expect people to be state of the art and to maintain that level," says Donna McNamara, director of human resources at the Corp. Technology Group of Colgate Palmolive Co. in Piscataway, N.J.

It's what can be layered on top of those technical skills that really makes the difference, says McNamara — things such as the ability to listen to clients, understand their needs and communicate with them; the ability to think like a businessperson; and the ability to work as part of a team that includes business and financial people as well as systems professionals.

Personal skills a plus

Other IS directors echo McNamara's insistence on a combination of technical and business/personal skills. Their message is clear: Neither skill set is enough by itself anymore.

"The IS person must understand the business and then know where to get the technology to solve the problem," says Christina Kucharyszyn, manager of IS staffing at Glenview, Ill.-based Kraft General Foods, Inc. She warns prospective IS staff members at Kraft to be prepared to spend as much as 95% of their time working with users.

To find these people, many firms are paying a premium — at least for certain skill combinations — despite corporatewide efforts to keep costs down.

Gilmore has found it imperative to "hang onto key people," despite the intense pressure to cut costs. As a result, she has been "fairly generous with salary increases," even as she moves people into the end-user PC networking environment.

At Spalding, White pays a premium for the combination of

Hot technologies

Staffing consultants see a growing demand for personnel grounded in a number of new technologies. The following are among the most desirable competencies:

• **CASE and fourth-generation languages.** Programmers and analysts who know how to use these tools are finding that they can command a premium, particularly in IBM midrange and mainframe environments.

• **Unix and open systems.** Consultants say most of the activity in this area is currently at the departmental level. Unix programmers, however, are in short supply and get top dollar.

• **Personal computer applications developments.** IS staffs are regaining influence over PC applications development. Some shops are moving applications development to PC platforms. DOS and OS/2 skills are in demand, but PC-only experience does not pay as well as PC skills combined with more conventional IS skills. Experience with Microsoft Corp.'s Windows and Presentation Manager as programming environments pays much better than standard PC development.

• **Networking.** While IS shops are paying increased attention to networking, most of the work and the best salaries are going to networking and telecommunications specialists.

• **Relational databases.** Experience with DB2, Oracle Systems Corp.'s Oracle, Ingres Corp.'s Ingres, Sybase, Inc.'s Sybase or other relational databases is in short supply and will attract excellent compensation.

• **Client/server.** Almost any experience with client/server architecture will bid up the salary offers.



technical skills and business knowledge. But, he adds, "the closer you get to the end user — the pure PC person — the softer the salaries get."

If the IS staff is increasingly involved with the user, then who is doing the routine or specialized work of IS? Often, the departments are turning to outsiders — independent contractors who come either with a highly specialized skill or as a general

half of them independent contractors. "We hold the [permanent] head count at 100, because that's the appropriate long-term level," he notes.

"The real value of consultants is when you are doing a conversion. Otherwise, we prefer permanent staff," Crasper says. Kendall went through a major conversion to IBM Application System/400s and used contractors extensively but has since minimized the use of outsiders.

Even Alan Bugh, vice president of MIS at Wilson Sporting Goods Co. in River Grove, Ill., brings in contractors for some projects, although he doesn't like using them. "These are not very exciting projects — things like IMS-to-DB2 conversions," he explains.

"If the project is going to last, say, 18 months, then I'll hire, but if it's just for three or four months, then I'll use a contractor," Fishburne notes.

Despite the dim economic outlook, corporate imperatives to reduce expenses and the increasing use of programmer productivity tools, growth in IS staffs is inevitable, because demand for information continues to skyrocket.

"There continues to be growth because there is such a demand — more and more projects. We never make as much progress as we'd like to," says Garland Gunter, director of MIS at Cincinnati-based Lenscrafters, Inc. •

Bend and stretch

In an effort to attract and keep good people, some information systems departments are starting to consider more flexible work arrangements (see story page 84).

"A lot of IS lends itself to nontraditional work arrangements," says Gil Gordon, a Monmouth Junction, N.J., consultant specializing in IS staffing issues.

Spalding Worldwide Sports is flexible about when people put in their hours, says MIS director Bard White, and some IS staff members work from home using remote terminals. The only stipulation, he says, is that arrangements be made in advance.

George Buick, vice president of distribution, warehousing and IS at Highland Superstores, Inc., says he is happy to provide flex time, although Highland itself doesn't endorse it. "It is necessary in IS," Buick says, to relieve traffic pressure on a computer that "is busy from 9 to 5." Job sharing is a more difficult situation, he says, although "IS jobs can often be broken into small pieces and done by part-timers."

George DiNardo, executive vice president at Mellon Bank Corp., says he'll try anything to attract good people and boost productivity: "Telecommuting, flex time — anything that relieves pressure on the CPU, I'm happy." Job sharing? "Sure, that gets me about 2½ times the output out of two people."

There are limits to how much flexibility can be built into IS jobs. Alternative work schedules can, for example, conflict with the need to increase interaction with users and can represent a headache for managers trying to juggle schedules. For the most part, however, only a small part of the eligible staff will avail themselves of such arrangements. On Mellon's IS staff, about 5% participate.

COMPANIES EVERYWHERE ARE either tightening their belts or trying to get into condition in case that need arises. The impact of this new emphasis on trimmed-down fitness is being felt in IS.

reinforcement to take over routine programming chores during peak periods.

The use of independent contractors, like outsourcing itself, has become an accepted option, but there is no major upswing in the use of consultants, Wonder reports. Contractors are used mainly as a short-term solution.

At Highland, for instance, Buick is able to keep his IS staff stable at about 100 people, despite going through an IBM System/38-to-mainframe conversion that requires rewriting every application, by turning to independent contractors. At times, the population of his IS shop has reached 200 people,

Player-managed teams score very well

BY SHERYL KAY

The self-managed team is being hailed as the latest and greatest idea in management theory and the possible key to the U.S.' productivity conundrum. Although it is hardly likely that a concept could live up to that billing, many companies across the country that have experimented with letting groups of employees manage themselves say the results are impressive. For the most part, these experiments have taken place in manufacturing settings. Some people, however, believe this is an idea that is tailor-made for information systems organizations.

The way self-managed teams operate is that a group of four to 15 employees is given the authority to set their own work schedules, target strategies, disciplinary procedures and other processes. These groups may be permanent or formed for the duration of a specific product. They may be culled from one department or represent a cross-functional mix. In place of a manager, the team adviser usually

serves as a resource individual.

There are many opportunities to apply this concept to the IS department, says Kathryn J. Hayley, senior manager at Deloitte & Touche in Chicago. The more managers you have on your IS teams, she says,

Shrednick says operations team reduced costs

the more time you'll spend on administrative activities that only serve to "burn time and money."

Harvey Shrednick, vice president of information services at Corning, Inc. in Corning, N.Y., reached a similar conclusion two years ago when the company's operations manager accepted a new position at another division of Corning. "It gave us the impetus to say, 'Why bother refilling the job?'" Shrednick says.

Today, the computer operations area at Corning functions as a fully self-managed team. "They develop their own training requirements, schedule their own shifts, do their own personnel reviews and award merit increases," Shrednick says.

Since the change, the quality of work has improved, Shrednick says. Systems availability is up, and the cost of running the department is down. In fact, the benefits of the team approach have become so apparent that Shrednick has started similar groups in several other areas, including customer service, the computer utility business team and administrative systems. By January 1991, technical services will also be self-managed.

At Hyatt Corp. in Chicago, autonomous work groups have a shorter history, but results have been equally promising. Gordon Kerr, vice president of MIS, initially moved to this management method as a matter of necessity. He had two groups of applications developers at work on two important projects. What he didn't have, he says, were the "available personnel or the time to attempt the traditional management approach."

Although born of scarcity, the ap-

proach paid off handsomely, according to Kerr. Not only were projects completed on time, he says, but there was also "a shared learning experience and a sense of ownership about the projects."

At Chaparral Steel in Midlothian, Texas, a company cited as an example of productive manufacturing by MIT's Commission on Industrial Productivity in 1989, IS staff members work on self-managed teams as part of larger cross-disciplinary efforts. Dave Fournie, who oversees a portion of the IS department as part of his responsibilities as general manager of operations, points to an inventory group,

which is broken down into three self-directed subteams: quality assessors, production trackers and software designers and developers.

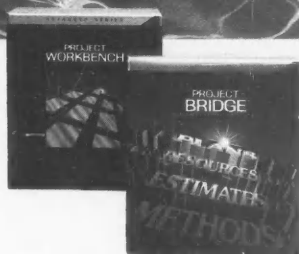
According to Fournie, the combined efforts of these teams have streamlined inventory procedures, giving Chaparral a strong competitive advantage.

Of course, self-managed teams don't work in all situations. Certain IS groups may not function well in the self-directed work model. Some people want to be told what to do, Fournie says: "When you give them full authority, they back off and say, 'You are going to help us, aren't you?'"

There are other inhibitors as well. Hayley says that if the IS team does not have a well-defined task, a solid set of technical skills, sound business judgment and members who can be trusted and know when to seek help, then the self-directed style should not be considered.

Frank Opperman, logistics manager at the Tape Manufacturing Division of 3M Co. in Freehold, N.J., says he probably wouldn't try it. Although such teams are already operating in many parts of 3M, Opperman doesn't think the idea would work in IS, which has to respond rapidly to changing business requirements. •

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.



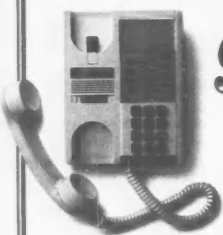
That priceless knowledge is gone... but your full two-year project plan complete with resource and cost estimates is still due tomorrow! That's why ABT developed Project Bridge™—the planning and estimating system for applications developers that never gets sick, takes a vacation or retires. Seamlessly integrated with Project Workbench®, Project Bridge makes novices instantly productive and even helps "old pros" cut planning time by as much as 90%. Based on a proven methodology and project knowledgebase — accurate plans, risk and cost benefit analyses can be generated quickly and consistently. And that leaves you more time to do what you do best... manage and control your project. You may even have time to catch a few rays yourself.



APPLIED BUSINESS TECHNOLOGY CORPORATION

Call 212-219-8945 for: ☐ Free seminar dates ☐ More information

© 1990 Applied Business Technology Corporation. Hardware Requirements: IBM PC, XT, AT, PS/2 or compatibles. PC/MS DOS 2.0 or higher with hard disk installation and min. 512K RAM. Project Workbench is a registered trademark and Project Bridge and the ABT logo are trademarks of Applied Business Technology Corporation.



9:45 P.M. Welcome. This is Guest Messaging. You received one call before you checked in. Message one: "John, this is Ted.

They moved our meeting up to 8:30. I'm not sure where, yet. I'll call you in the morning to let you know."

10:00 P.M. "I'd like a wake-up call for 6:00 A.M. And can you put a Do Not Disturb on my phone? Thanks."

10:06 P.M. We're sorry, room service is now closed. You can place a

breakfast order by pressing 3.



"I'd like two eggs, over

easy, with bacon. Make sure the bacon's crispy. Toast,

lightly buttered. Freshly squeezed orange

juice. And coffee, black. To room 235 at

6:15."

6:00 A.M. Good morning. This

© 1990 Northern Telecom. Meridian 1 and Meridian are trademarks of Northern Telecom. M000011

THIS GUEST'S STAY DEMANDS



Meridian 1 Communication Systems

To handle all these various calls and features, Northern Telecom's Meridian 1 Communication Systems works with a hotel's Property Management System—the computer

Meridian 1 makes life easier by putting stand-alone features and PBX functions in one modular package.

application that manages all hotel guest transactions. And frankly, ordinary PBXs just aren't smart enough to do this.

That's because the Meridian 1, unlike your average PBX, put features like voice mail, networked ACD, and interactive voice response in one modular package and

is your wake-up call.  You have one new voice message. Message

one: "John? Ted again. Don't forget to bring the revised contract to the

meeting. Still don't know what room we're in." **7:00 A.M.** To record

your own personal greeting, press 7.  "I just went down for a

quick workout. I'll be back in a few minutes.

Leave your message at the sound of the beep."

7:20 A.M.  You have one new voice

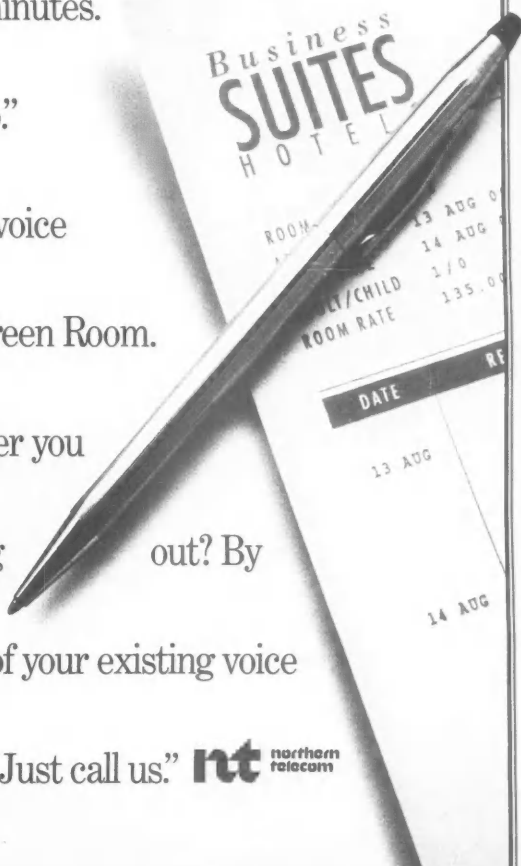
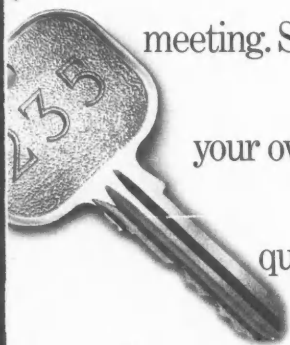
message. Message one: "John, we're in the Green Room.

See you there at 8:30. Oh, and that fax number you

need is 555-4473." **8:00 A.M.** "Checking out? By

the way, Mr. Siebert, if you need to hear any of your existing voice

messages, you can access them for 24 hours. Just call us." 



MORE THAN AN ORDINARY PBX.

taught them how to work with each other in a way no ordinary PBX ever could. Making it a very intelligent, very efficient communication system for your business. And we say that without reservation.

Call **1-800-328-8800** and compare the many applications Meridian 1 offers your business to what an ordi-

nary PBX can do. You'll find that it's more than a PBX.

NORTHERN TELECOM

TECHNOLOGY THE WORLD CALLS ON

What's the matter today with information systems staffs?

FIRST PERSON

BY LOUIS SCHANER



After more than 20 years of alternating between full-time and contract employment as a programmer/analyst, I am convinced of two things: One is that, although information systems personnel can be diffi-

cult to manage, they are not nearly as self-centered and lacking in loyalty as is usually portrayed. The other is that this misconception stems largely from the fact that IS departments are usually no better managed than the companies that house them.

Problems in IS staffing and staff management are symptomatic of a macro problem plaguing the entire country. We are a country of mature organizations whose energies are mostly spent in keep-

ing the bureaucratic machinery oiled and running.

Synergy and individual contributions are subordinated to maintenance, and employees are measured by how well they fit and perform within the confines of the machine.

Older not always better

If a new cog doesn't fit properly or makes too much noise, we try greasing it, then modifying it. If neither of these actions work, we end up replacing the cog with a new one.

What that ignores, of course, is the probability that the new cog is the best component of the machine and that a far better course would be to consider replacing the surrounding worn-out parts that

can't perform up to the standards of the new one.

Most IS departments don't acknowledge that this is the way they operate—but it is. When they advertise for employees, they emphasize the opportunities, the technologies they have invested in, the training that is available and the strategic directions.

Then, as often as not, they try to turn the database administrator they have hired into a programmer developing in Cobol on a personal computer. The exciting tools that were mentioned in the interview turn out to be off-limits, because the company isn't really interested in exploiting the technology right now. The training programs are often very real but serve only to help disgruntled professionals build their portfolio of skills for the next job interview, because there is nowhere to apply the learning in their present jobs.

Of course, there is a reasonable explanation for much of this: Faced with a growing shortage of highly skilled professionals, IS managers often hire the best people they can find, with the hope of eventually finding the ideal slot for them—one that will make use of their skills and knowledge of advancing technologies. Unfortunately, by the time the right job materializes, the person has usually left.

Less easy to explain is the unwillingness of many organizations to listen to ideas or explanations of reality from staff members. I've seen developers come up with estimates for projects using a company's approved methodology, only to be told that the job will have to be done for a third of the cost in a fraction of the necessary time. I've also seen plans rejected or ignored when advanced by staff members and then subsequently embraced when put forth—without substantial change—by an outside consultant. In fact, I've been on both sides of that particular fence.

Contributing factors

Many of these problems result from bad management practices that permeate the whole company, not just the IS department. Furthermore, IS departments are often hobbled by policies over which they have no control.

One major example is human resources guidelines that allow the hiring of a new employee at a substantial increase but prevent giving the same amount as a raise to a current staff member who has acquired enough new skills to justify the raise but has not accumulated what is considered to be enough time in his current position.

More aggressive compensation and more flexible management could help to stem turnover considerably and build more stable and productive IS staffs.

What could help even more, however, is commitment to the principles, philosophies and methodologies put forth by any of the gurus of total quality management.

A company or IS department that builds its culture around those ideas won't have to depend on consultants for constructive ideas. The employees will come up with plenty of ideas on their own—and will stick around to see them implemented. ●

Schaner operates a consulting company based in Madeira Beach, Fla. He has worked in the information systems field for 23 years, spending roughly equal parts of that time as IS employee and consultant.

IF WE'VE SOLD IT ONCE, WE'VE SOLD IT 2,000 TIMES.



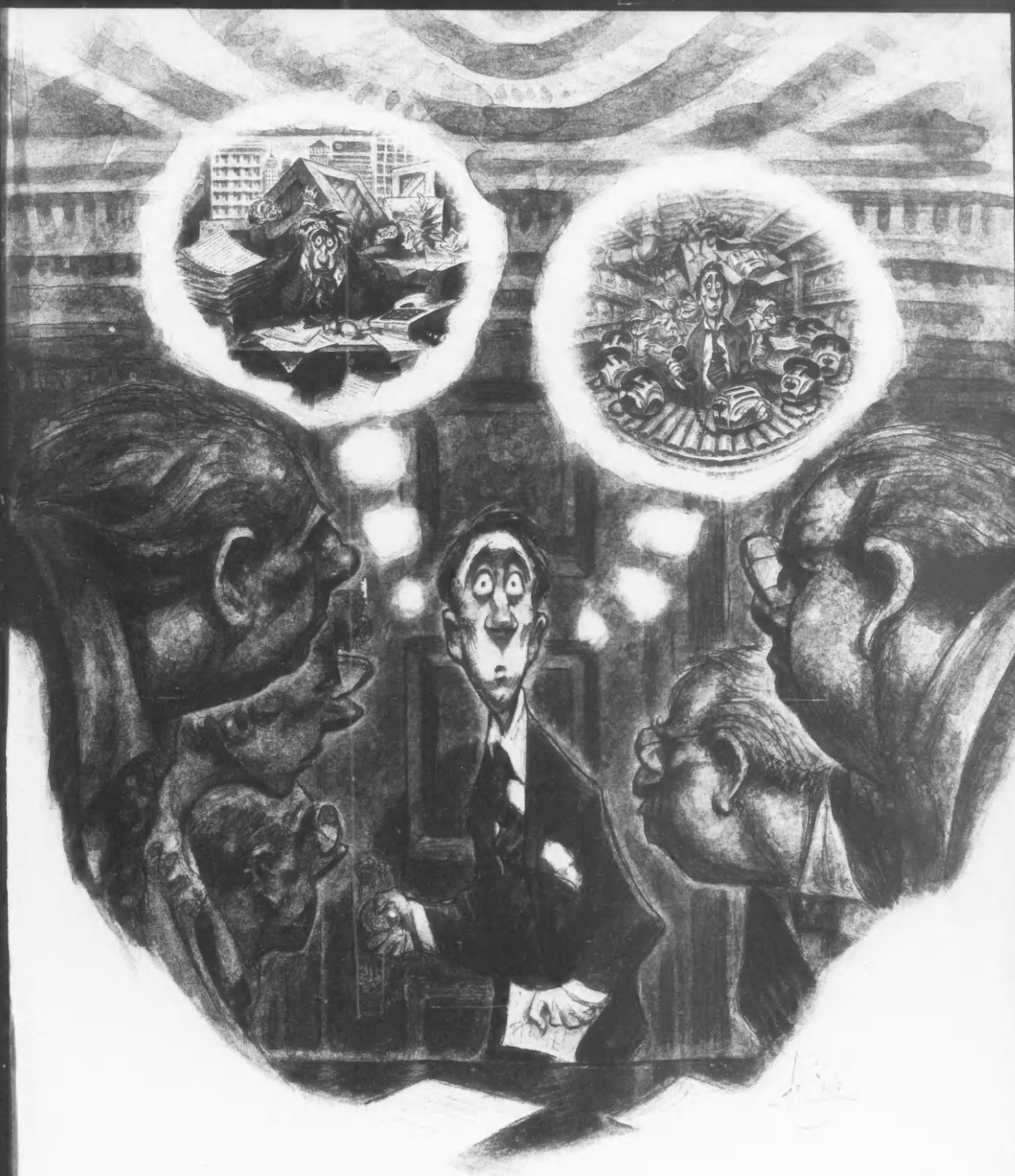
We don't mind repeating ourselves. In fact, when the repetition involves sales of the StorageTek 4400 Automated Cartridge System, we're absolutely delighted. In just 2½ years, we've installed 2,000 of our revolutionary information storage libraries. By the way, number 2,000 went to Automobiles Citroën—member of Peugeot Group, giving us a total of 100 libraries in France. Citroën and the other 699 recipients of the 4400 ACS have discovered our Nearline® technology offers access to up to 96,000 cartridges at nearly the cost of offline but nearly as fast as online. They've discovered the benefits are also delivered with

unheard-of speed—greater productivity, more efficient operations, reduced disk-storage expenditures and lower overall storage costs.

And while many companies have scrambled to establish a presence in this category, StorageTek has left every one at the starting line. That's just one reason we'll reach a second numeric milestone this year—one billion dollars in revenues. If you'd like to find out what the 4400 ACS can do to improve your mainframe or super-computer environment, call us at 1-800-456-7689. We'll give you 2,000 reasons to become our customer. But hurry, before your competition becomes number 2,001.



StorageTek



*Due to previous software problems,
the board is holding a meeting in your honor.*

*Thanks to KnowledgeWare CASE tools,
you're getting a bonus instead of the boot.*

Information systems software. It's what holds your company together. Good information systems can even be a competitive advantage.

Unfortunately, the old ways of developing software take too long. By the time an application is ready, your needs have changed or an opportunity has passed. Worse yet, errors in design or programming can create havoc with your business — and take years to find and fix.

It doesn't have to be that way. Now you can give your software developers Computer-Aided Software Engineering (CASE) tools from KnowledgeWare. Using KnowledgeWare CASE tools, your software developers can deliver more business applications in less time. Your company gets the information systems it needs to support new products and services. Ahead of your competitors.

Quality is better too. Applications match business requirements right from the start. No matter how large and complex they are. Furthermore, the software is easier and less costly to maintain as your needs change. Even if the people who originally created it are no longer around.

With more than 40,000 units installed in 31 countries, KnowledgeWare is the number one supplier of CASE tools. And our close relationship with IBM makes us the natural choice of IBM users.

For more information, call 1-800-338-4130

KnowledgeWare, Inc., 3340 Peachtree Road N.E., Atlanta, GA 30326.



KnowledgeWare®

*The World's Most
Comprehensive CASE Tool Set™*





Here's what users are saying about KnowledgeWare CASE tools:

"When we started looking at CASE tools, we wanted to pick a vendor that had integrated products. So far, KnowledgeWare has been the only one that has really delivered on any type of integration. KnowledgeWare tools offer 100% integration on the data aspects. You don't feel like you're jumping between tools even though you are. And from one who's used the tools to do development and looked at other tools, KnowledgeWare's tools have a very good interface."

Technical Team Leader
Major Southeastern Utility

"Being able to generate COBOL applications on the PCs saves the programmers a great deal of time and saves us a tremendous amount on CPU resources."

Vice President
Large Marketing Company

"Our staff is 25% more productive per account here than at a traditional bank due to the automation. KnowledgeWare's tools help us to quickly and accurately develop the systems to give us the competitive edge."

Systems Development Manager
British Bank

"We like the openness of methodology we get with KnowledgeWare tools. The tools let us develop a methodology that fit the experience of our people. When the methodology fits the people who use it, it's a lot easier to get them to buy into it."

President
Financial Software Development Firm

"The toughest thing we have to do is manage the data environment, and KnowledgeWare's CASE tools are really valuable to us there. They support our longer term objective of creating a data dictionary environment and providing management-level control over the application development process."

General Manager
Southwestern Electric Utility

"Without the (KnowledgeWare) IEW it would have been impossible to demonstrate to management that we had the capability of absorbing and analyzing enterprise-wide modeling information. To do it manually would have taken at least 50 people. We've done it with just 15."

Systems Architect
Aerospace Manufacturer

"We've found that with the IEW/Construction Workstation, we haven't run into a case yet where we can't produce all of the code automatically from the design. That's important to us. Our view is 'the fewer places we have to write COBOL, the better.'"

Project Manager
British Software Development Firm

"We did a function point analysis of the design and analysis of this project and compared it with other similar projects done prior to the use of KnowledgeWare tools. Prior to using the tools, we averaged 8.7 hours per function point. With the KnowledgeWare tools, that dropped to 4.2 hours."

Technical Manager
IS Division of Manufacturing Conglomerate

"Another advantage of IEW tools is that all the information regarding analysis and design is stored in a single repository, available at your fingertips through a window-like interface."

Project Manager
British Water Utility

"KnowledgeWare tools could provide immediate productivity gains with the MS-DOS based IEW and also had the commitment of being compatible with AD/Cycle through its OS/2-based Application Development Workbench™ (ADW). We liked the idea of being able to get started right away with IEW, then migrate transparently to ADW without losing any of our analysis and design investment."

Corporate Information Technology Manager
Major U.S. Manufacturer

"Because of the magnitude of this project and the number of programmers involved, no other full life-cycle CASE tool set, except KnowledgeWare's, could have been used for this activity."

Project Consultant
Government MIS



KnowledgeWare®

The World's Most Comprehensive CASE Tool Set™

KnowledgeWare, Inc.
3340 Peachtree Road N.E., Atlanta, GA 30326
(800) 338-4130



IN DEPTH

Preparing for AD/Cycle

*Even though the real products are a ways off,
it's not too early to start the long climb*

BY SAMUEL B. HOLCMAN

Considering all the AD/Cycle component tools, the application development platform and the new development methodology needed to use them successfully, IBM's AD/Cycle represents one of the biggest changes in the history of systems development.

AD/Cycle will affect everyone involved with software development. No employees will continue to perform their jobs as they do today if they take advantage of AD/Cycle.

The magnitude and importance of this change demand that systems development organizations understand and manage the cultural and organizational changes that will take place.

Despite the fact that many AD/Cycle components are not yet available, the organizations that will gain the greatest competitive advantage from AD/Cycle have already begun to make preparations and are implementing their plans. There are many implementation activities that can — and must — be started today.

Who will take charge?

Unfortunately, being a "change leader" is not part of anyone's job description.

Few people responsible for implementing AD/Cycle have considered the organizational changes that face them. Even fewer have taken steps to ensure that the change process is managed effectively.

Considering the cultural and organizational difficulties that

many development organizations have had in implementing individual computer-aided software engineering tools, inadequate attention given to the AD/Cycle change process is guaranteed to cause the implementation to fail.

However, even more cultur-

understand how prepared an organization is to introduce AD/Cycle.

In their book *Changing Ways*, Murray Dalziel and Stephen Schoonover identify four attributes to consider when assessing how prepared an organization is for the

tributed to their success.

2) Clarity of expectations. Each organization affected by the introduction of AD/Cycle must clearly understand its role in the change process.

Misstated or misunderstood expectations have caused otherwise successful productivity tools and techniques to fail within a software development organization.

3) Amount of top management support. Support for AD/Cycle throughout the organization is a critical factor. Those who are most affected by AD/Cycle should play a major role in identifying the benefits to the software development process and the most effective methods of introduction. The size and expense of introducing AD/Cycle certainly require top management's support.

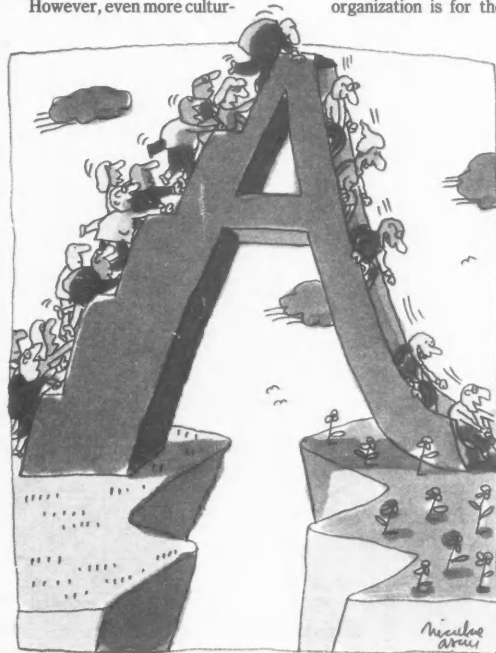
However, it is important for this support to be sustained throughout the various implementation activities and for it to be clearly visible to those who are affected by AD/Cycle.

4) Compatibility with organizational goals. Of course, top management's commitment to introducing AD/Cycle must also be consistent with other policies and directions being established by top management that affect system development practices.

As AD/Cycle implementation plans are developed, the impact of cultural and organizational change should constantly be considered.

Implementation plans should include activities that guide the change process so that change can be used as an asset rather than a liability.

Dalziel and Schoonover also identify five critical factors to consider when planning change. These five factors can be applied



Nicolas Aroni

al and organizational changes will follow as the system development community begins to implement AD/Cycle. It's clear that managing organizational change is a critical success factor in implementing AD/Cycle.

An important first step for every development organization to perform is a self-assessment. This is needed to evaluate and

needed change:

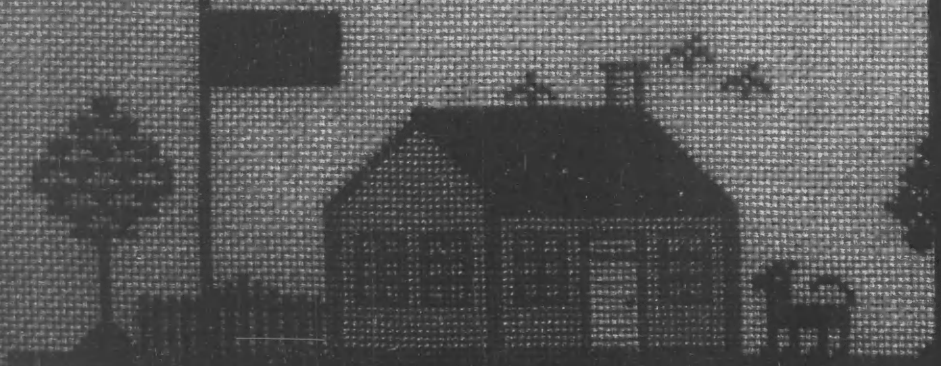
1) History of change. Historical results are a good indication of how ready a development organization is for the introduction of AD/Cycle.

It is important to understand how well previous implementations of new software development tools and techniques have succeeded and what factors con-

- Organizational changes are key
- Long- and short-term plans needed
- The time to start is now

Holcman is president of Computer & Engineering Consultants Ltd. in Southfield, Mich.

HOME
SWEET
HOME



COMPUTER ASSOCIATES



We'd Like To Welcome IBM Back To VSE. (We Never Left.)

Do you remember when they said VSE was history?

IBM walked away. All those software companies walked away. Everybody did.

Except us.

For the past 15 years, we've stood side by side with our VSE clients. While others scaled back their development—we increased ours. We were always the first with more effective and innovative VSE software solutions. We were always there with the service, the support and tens of millions of dollars in R&D.

And that's why today, we have the largest VSE client base of any software vendor (50,000 VSE licenses) and more VSE, SAA-compliant software solutions than anyone. We are the VSE experts.

And now, the VSE/ESA experts. Our Computing Architecture for the 90s enables us to be the first to support it. Working closely with IBM, we have developed the industry's broadest line of VSE/ESA software solutions. They cover all of your software needs including Systems, Information Management and Business Applications.

Coming this February, we will be offering the first in a series of special VSE/ESA Educational Workshops. Everybody's invited.

Even IBM.



CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

**COMPUTER
ASSOCIATES**
Software superior by design.

WHAT DO THE FOLLOWING TECHNOLOGIES HAVE IN COMMON?

WORKFLOW SOFTWARE

OCR

FORMS SOFTWARE

All three technologies will alter your fundamental vision of automation in the future. To discover how you may leverage these technologies within your own organization, plan on attending the only conference specifically designed for companies looking to employ IMAGE SYSTEM technology.

For more information on:

IMAGE SYSTEMS: BEYOND THE OBVIOUS

January 16-18, 1990
Phoenix, AZ

Call 1-800-525-5456 x-456

Sponsored by IDC/Avante Technologies, Inc., a Joint Venture
5 Speen Street, Framingham, MA 01701

to AD/Cycle implementation:

1) **Clarifying plans.** AD/Cycle implementation plans and benefits should be defined and conveyed to everyone affected by the new systems development environment. This includes clearly identifying the changes that are required by all levels of the organization.

2) **Integrating new practices.** Time should be taken to learn how the AD/Cycle tools and methodology will be incorporated into the existing systems development environment.

Everyone involved in the software development process should clearly understand when to utilize the new AD/Cycle components and when possibly to continue to utilize previous development practices.

ESTABLISHING A SENSE of ownership will lead to greater acceptance and more effective use of AD/Cycle.

3) **Providing education.** AD/Cycle requires many people to learn new roles and take on new responsibilities within the software development process. Education and support need to be provided to these individuals so that they can learn to effectively utilize AD/Cycle components and processes.

4) **Fostering ownership.** A continual effort must be made to avoid "imposing" AD/Cycle on software development organizations.

Establishing a sense of ownership will lead to greater acceptance and more effective use of AD/Cycle. Individuals who are affected by AD/Cycle should have key participation roles in the planning and implementation of AD/Cycle activities.

5) **Giving and getting feedback.** AD/Cycle implementation objectives should be defined and monitored during all introduction activities. The effectiveness of implementation activities should be used as feedback to modify and improve AD/Cycle implementation plans.

The justification for AD/Cycle is another key aspect that has to be addressed

AD/Cycle in six steps

Software visionary Ed Yourdon has identified six changes required by software development organizations that introduce IBM's AD/Cycle:

1) An organizational commitment to use a common, standard set of development tools and methodologies rather than every software engineer and/or project team using a private set.

2) An organizational commitment to use a code generator and/or application generator and get out of the business of handwritten code.

3) The use of a common repository to store all information about all systems in the organization and the decision to treat this information as a major corporate asset.

4) A shift in emphasis away from superfast production of mediocre systems to a new emphasis on high-quality systems that are responsive to user needs.

5) A corporate commitment to capture metrics on all aspects of systems development and maintenance.

6) A decision to use an active approach to software reusability at the beginning of projects.

SAMUEL B. HOLCMAN

during the preparation activities. Steps need to be incorporated into the implementation plans that measure and document the benefits of AD/Cycle.

First things first

Before that, however, software development organizations must understand and document how well they perform software development activities today.

By understanding which software development steps are performed well and which need improvement, AD/Cycle

Short-term strategies

Your short-term plan for implementing AD/Cycle should identify steps that can be performed during the coming year.

These will get you started and help your organization achieve some of the longer range benefits.

1) Assess current capabilities

Establish AD/Cycle project team
Review current applications development approach

Assess current tools
Identify current skills
Assess organizational readiness

2) Establish methodology

Talk to others
Identify alternatives
Develop methodology
Document methodology
Prepare education materials

3) Select initial AD/Cycle components

Establish tool requirements

Evaluate and select AD/Cycle tools

Identify education and support

Complete justification process

Acquire and install AD/Cycle tools

4) Initiate education plan

Identify skill requirements
Evaluate education sources
Develop initial education plan
Begin education program

5) Establish measurement program

Select metrics
Establish measurement procedures
Measure current quality and productivity levels

6) Conduct pilot projects

Identify and select projects
Prepare project plans
Acquire management support
Educate project team
Conduct projects
Document project results

SAMUEL B. HOLCMAN



YES, I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$38.95* per year — a savings of 62% off the single copy price.

First Name _____ MI _____ Last Name _____
 Title _____ Company _____
 Address _____
 City _____ State _____ Zip _____
 Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: \$48 per year

* U.S. Only, Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

E4048B-7



YES, I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$38.95* per year — a savings of 62% off the single copy price.

First Name _____ MI _____ Last Name _____
 Title _____ Company _____
 Address _____
 City _____ State _____ Zip _____
 Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: \$48 per year

* U.S. Only, Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

E4048B-7

1. **BUSINESS/INDUSTRY** (Circle one)
 10. Manufacturer (other than computer)
 20. Finance/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government - State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Refining/Agric.
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 90. Computer/Peripheral Dealer/Distr./Retailer
 75. User: Other _____
 95. Vendor: Other _____ (Please specify)

2. **TITLE/FUNCTION** (Circle one)
IS/MIS/DP MANAGEMENT
 19. Chief Information Officer/Vice President/Asst. VP
 21. Dir./Mgr. MIS Services, Information Center
 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm.
 23. Dir./Mgr. Sys. Development, Sys. Architecture
 31. Mgrs., Suprv. of Programming, Software Dev.
 32. Programmers, Software Developers
 60. Sys. Integrators/VARs/Consulting Mgt.
OTHER COMPANY MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer
 41. Engineering, Scientific, R&D, Tech. Mgt.
 51. Sales & Mktg. Management
OTHER PROFESSIONALS
 70. Medical, Legal, Accounting Mgt.
 80. Educator, Journalists, Librarians, Students
 90. Others _____ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
 Types of equipment with which you are personally involved either as a user, vendor, or consultant.
 A. Mainframes/Supernovels
 B. Minicomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Local Area Networks
 F. No Computer Involvement

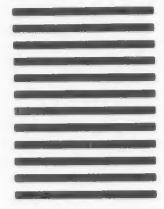
1. **BUSINESS/INDUSTRY** (Circle one)
 10. Manufacturer (other than computer)
 20. Finance/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government - State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Refining/Agric.
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 90. Computer/Peripheral Dealer/Distr./Retailer
 75. User: Other _____
 95. Vendor: Other _____ (Please specify)

2. **TITLE/FUNCTION** (Circle one)
IS/MIS/DP MANAGEMENT
 19. Chief Information Officer/Vice President/Asst. VP
 21. Dir./Mgr. MIS Services, Information Center
 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm.
 23. Dir./Mgr. Sys. Development, Sys. Architecture
 31. Mgrs., Suprv. of Programming, Software Dev.
 32. Programmers, Software Developers
 60. Sys. Integrators/VARs/Consulting Mgt.
OTHER COMPANY MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer
 41. Engineering, Scientific, R&D, Tech. Mgt.
 51. Sales & Mktg. Management
OTHER PROFESSIONALS
 70. Medical, Legal, Accounting Mgt.
 80. Educator, Journalists, Librarians, Students
 90. Others _____ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
 Types of equipment with which you are personally involved either as a user, vendor, or consultant.
 A. Mainframes/Supernovels
 B. Minicomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Local Area Networks
 F. No Computer Involvement



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

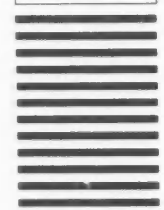
POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



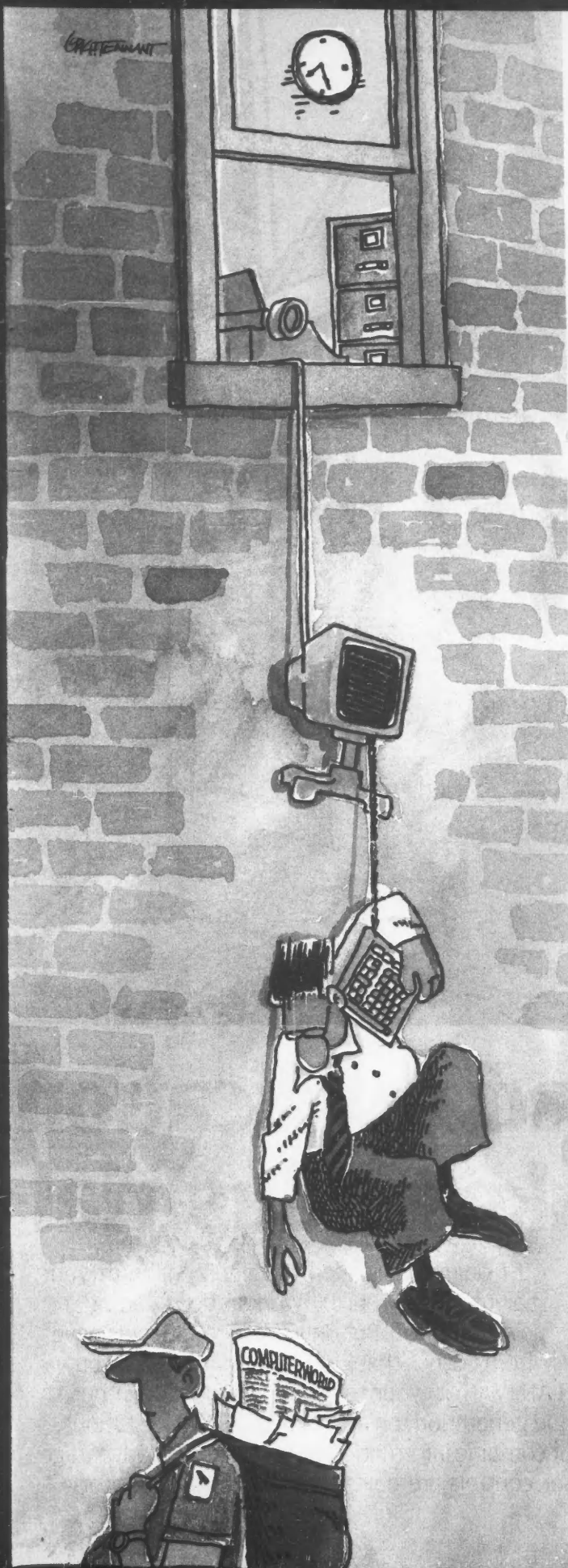
BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144





There's no end to how far people will go to get **COMPUTERWORLD** first.

Do you risk life and limb each week to be one of the first in your company to nab the office copy of *Computerworld*?

Well now there's a better-and safer-way to get the latest, most up-to-date news in the information industry, hot off the presses.

Subscribe to *Computerworld* and receive 51 issues of the best-read publication in the information industry. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the top companies using information systems technology.

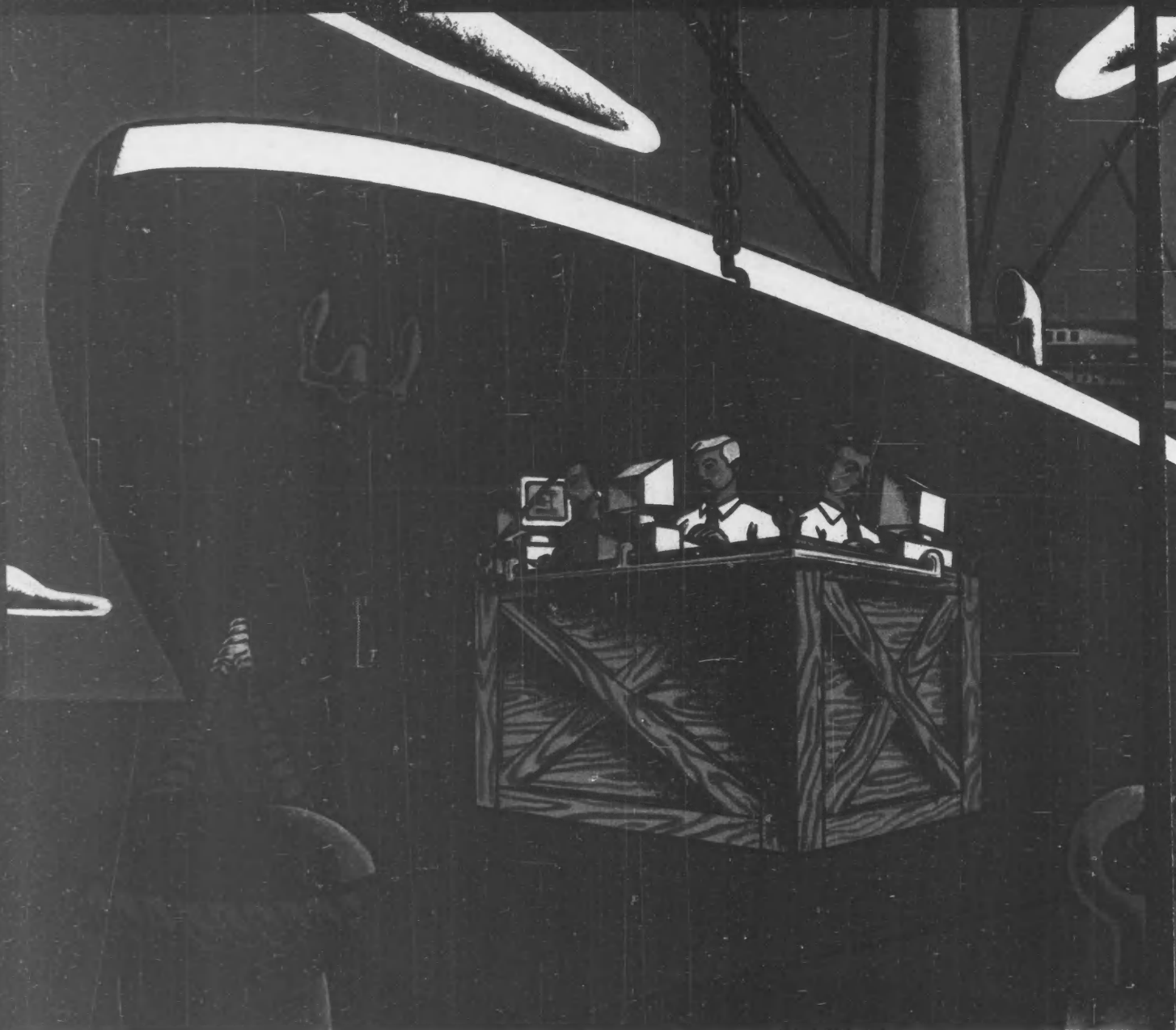
There's no need to wait days before your company or department subscription reaches your desk. And there's no need to go to extremes just to be among the first in your company to read about the products and people, trends and technology, issues and information that shake the IS community each week.

Just use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Why take chances?



The Newsweekly of Information
Systems Management



To Off-Load Application It Takes Industrial-

PACLAN. Team Development From Design To Code On A LAN.

Off-loading application development from your mainframe to your PC workstations can be a powerful move. But only if your CASE tools have the muscle to make your PCs work together. PACLAN™ from CGI has that kind of strength. PACLAN brings the power of an active, multi-user repository to a LAN. With it, your team of developers can build applications together, from design to complete code generation, on a network of PC workstations.

Unlike CASE tools that make it tough to share or combine information, PACLAN takes full advantage of the client/server architecture of a LAN. Multi-user controls are built into the PACLAN repository,



Development To A LAN, Strength CASE.

allowing developers to share information interactively. And PaCLAN empowers you with other capabilities no other CASE tool offers: industrial-strength facilities for version control and change management across applications and workstations. Plus the horsepower to generate and maintain complete systems directly from specifications for over 30 target environments.

To find out how you can gain industrial-strength results by off-loading development onto a LAN, just call 800-PAC-1866 or 914-735-5030. And discover how to lose mainframe weight without losing an ounce of muscle.



CGI Systems.
Industrial-Strength CASE.™

implementation activities can be prioritized by need.

Furthermore, if the effectiveness levels of current development practices are measured and quantified, these measures can be used to determine the improvements, benefits and justification associated with implementing AD/Cycle.

Because one of the primary motivations in introducing AD/Cycle is to improve software development productivity and quality, we need to understand the productivity and quality levels currently being achieved by the development organization.

Software guru Ed Yourdon has written: "It makes no sense to bring in expensive tools to improve productivity if you don't know your current productivity lev-

SUPPORT FOR AD/CYCLE throughout the organization is a critical factor. Those who are most affected by AD/Cycle should play a major role in identifying the benefits to the software development process and the most effective methods of introduction.

el. Why bother trying to increase quality if you don't know your system's current quality level and you have no agreed-upon way of measuring quality?"

Software development organizations should measure current productivity and quality levels *before* they introduce AD/Cycle.

To accomplish this, a short-term strat-

egy can be identified and executed to prepare development organizations for AD/Cycle (see story page 72).

AD/Cycle provides the software development community with great potential for increased productivity and quality improvement.

However, this improvement will be realized only by those organizations that

prepare themselves wisely. The good news is that many of the AD/Cycle tools are not yet available, allowing software development organizations time to get ready.

With the tremendous impact AD/Cycle will have on software development in the '90s, failing to prepare will be equivalent to preparing to fail. •

Long-term strategies

As additional AD/Cycle components become available, you'll need to develop a longer range strategy.

This plan will identify the remaining steps needed to integrate future AD/Cycle components into a comprehensive environment that can support software development, implementation and maintenance activities.

1) Review short-term results

Consolidate project results
Document quality and productivity improvements

Identify remaining areas for improvement

Develop continuing introduction recommendation

Renew management support

2) Complete methodology introduction

Review project feedback
Revise methodology
Update documentation
Revise education materials
Establish ongoing feedback and improvement process

3) Select additional AD/Cycle components

Update tool requirements
Evaluate and select additional AD/Cycle tools

Identify education and support
Develop integration plan
Complete justification process
Acquire and install AD/Cycle tools

4) Complete education program

Review/revise skill requirements
Evaluate education effectiveness

Update education plan
Complete education program

5) Deploy measurement program

Begin ongoing measurement program

Identify quality and productivity improvement opportunities
Establish quality and productivity goals

Integrate measurement reporting into planning processes

6) Establish support functions

Review project support skills and effectiveness

Identify support organizations:

- Methodology
- Data administration
- Process administration
- AD/Cycle components
- Training
- Measurement

Develop personnel recommendations

SAMUEL B. HOLCMAN

Computerworld

EDITORIAL REPRINTS

Reprints from Computerworld provide a valuable marketing/sales tool for your company!

Editorial articles are available as reprints and can be ordered in various quantities, and customized to include your company logo and sales offices. Whether you wish to have reprints of an article written specifically about your company or a subject of general interest, these reprints* can be a great resource for use in:

- Promotional/P.R. materials
- Internal meetings
- Company seminars

* Produced in a minimum quantities of 500 for black-and-white and two color reprints; 1,000 for four-color reprints.

For complete information on ordering reprints contact:

Sharon Bryant
Reprints Department
Computerworld
375 Cochituate Road
Framingham, MA 01701-9171
Tel. 508-879-0700



COMPUTERWORLD

The newspaper for information systems management

YOU'VE READ THE REVIEWS . . . NOW JUDGE FOR YOURSELF

250 new titles in our library of the world's leading mainframe development tools show their unique blend of CASE / AGL / DBMS in action. Each volume illustrates step by step the solution process to a standard case study. Aimed at IS managers, developers, consultants, system houses, vendors, and educational institutions the library demonstrates the capabilities of the products. It provides an in-depth illustration of their form, style, and level of integration with working examples exhibiting the differences in software development technology. Compiled independently by U.K. based consultants Computing Futures Ltd, it brings for the first time a comparative analysis based on actual performance. The special Computerworld reader subscription price for a set of twelve monthly delivered volumes is \$2250, and specially reduced for educational institutions to \$1575. Individual copies may be obtained at \$500 (prices exclude postage and packing). You can also FAX your order on (508) 820-0146.

- ☐ Enrol my company and invoice us for _____ sets
- ☐ Educational institution ☐ Send me a brochure
- ☐ Single volumes. State month _____
- ☐ Charge my credit card for \$ _____ (plus P&P)
- ☐ Expiry date _____
- ☐ Non-corporate card holders should also show full home address overleaf.

Name _____ Mr / Ms / Dr
 (BLOCK CAPITALS)
 Title _____
 Company _____
 Address _____
 City _____ State _____
 ZIP _____ Country _____
 Phone _____ Order ref _____
 Signature _____
 Date _____

Upcoming Bench Marks Include:

Design Assistant / UNC / DMS II
 SAHND new innovative tools
 TRICEBATOR / CSE / DB2
 ORACLE CASE / SQL
 RCO-KIT / PRO-IV / DB2
 SW / Application Development Workbench
 R / DB2



DEVELOPMENT WORLD LIBRARIES

All used names contained are trademarks of the respective holders. Publishers reserve the right to substitute names or other schedules in line with the market.

Home address _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1126 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

DEVELOPMENT WORLD LIBRARIES

TEN SPEEN STREET
FRAMINGHAM
MASSACHUSETTS 01701-9508



COMPUTER INDUSTRY

NATIONAL BRIEFS

Future present

Scotts Valley, Calif.-based compact disc/read-only memory systems provider **Meridian Data, Inc.** earlier this month extended a seat on its board to former **Apple Computer, Inc.** executive Jean-Louis Gasse. Meridian President Fred Meyer said the firm hopes to leverage Gasse's experience in the computer industry as the CD/multi-media and commercial computer worlds converge. Meanwhile, back at Apple, a spate of executive announcements added up to a vote of confidence in **Michael Spindler**, nearing his first anniversary as president. Included: a board seat for Spindler.

Switching

After some 20 years in private data communications networks, Cambridge, Mass.-based **BBN Communications** is reaching to cut itself a heartier slice of the networking market. The firm said that over the next two years it will vault its traditional packet-switching and inter-networking capability into broadband networking based on cell switching. Toward that goal, BBN pledged to provide T1 and frame-relay support on its new T/300 packet-switching node and integrate its proprietary network management tools and applications on **Digital Equipment Corp.**'s EMA architecture by 1993.

What a CAD

Nostalgia is unlikely to be the reigning sensation as the computer industry bids adieu to 1990 next month; it might run high, however, in the CAD/CAM/CAE sector. According to a recent report from market research firm **Darattech, Inc.**, 1990 was a banner year for vendors in this arena, with overall revenue growth at 14.2%, up two points from 1989, and the three market leaders — **IBM**, **Intergraph Corp.** and **Prime Computer, Inc.**'s Computervision division — all posting solid double-digit increases. For Huntsville, Ala.-based **Intergraph**, in particular, 1990 should evoke fond memories as the year in which the firm broke the \$1 billion barrier, moved securely into the No. 2 position in the CAD/CAM market and outscored all direct competitors in user satisfaction, according to **Darattech**.

Filling in the gaps with Brownstone

DB2 development software firm makes its mark where giants don't tread

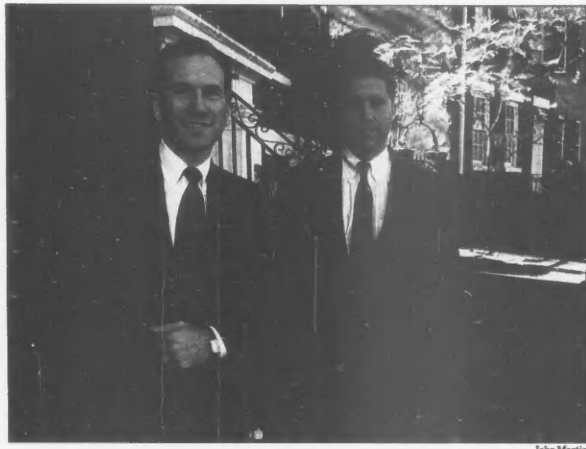
BY CLINTON WILDER
CW STAFF

NEW YORK — Think of development repositories, DB2 tools and computer-aided software engineering (CASE) methodologies, and you have to think big. Big names such as **IBM**, **Andersen Consulting** and **Knowledgeware, Inc.** come to mind — and **Brownstone Solutions**.

Who?

Brownstone, a 4-year-old, 16-employee software company tucked amid the bustle of midtown Manhattan, plays in the neighborhood of the big boys. In fact, **Brownstone** has something that the big boy named **IBM** doesn't have yet: a DB2-based data dictionary, called **Data Dictionary/Solution (DDS)**, that provides an environment for a DB2 software repository.

What made the **Brownstone**'s founders take their game to this arena?



Brownstone's Stone (left) and Brown found a need and filled it

"If we'd thought about it too hard at the time, we wouldn't have done it," director **Barry**

Brown explained. "Selling strategic software to Fortune 500 companies as a two-person out-

fit? People said we were crazy. But we didn't think of it that way. We just had ideas that we wanted to work on."

The company takes its name not from the handsome **Murray Hill** townhouses that line the streets near its office, but from the names of its co-founders and co-directors, **Brown** and **Stone**. These guys are not even "thirtysomething" yet — they are 30 (well, **Brown** turned 31 last week). And their highly specialized, highly technical software niche has doubled **Brownstone's** revenue every year so far and landed the company several accounts that include **Citibank NA**, **Merrill Lynch & Co.**, **General Mills Corp.** and **Metropolitan Life Insurance Co.**

Brown and **Stone** met right
Continued on page 82

Smart cards coming to forefront in Europe

BY PHILIPPE ROSE
IDG NEWS SERVICE

PARIS — From telephone cards to banking applications and pay-per-view television, smart cards are evolving into a mass market in Europe. According to market research firm **Dataquest, Inc.**, European smart-card production is expected to increase 35% annually and reach 200 million units by 1994, compared with 45 million units in 1989.

Currently dominated by credit cards and prepaid telephone cards — which are not "smart" — the value of the European memory-card market is expected to multiply 8½ times to total \$139 million in 1994, compared with its 1989 value of \$16.3 million, a compound annual growth rate of 54%.

Production of prepaid telephone cards, or token cards, and smart cards used in the banking sector currently account for more than 95% of the market. France's **Bull S.A.**, **Gemplus**, **Schlumberger Ltd.** and **Sligos Monétique** manufactured 41 million token cards in 1989, largely used as prepaid cards for public pay phones, vending machines and parking lots. Together, these firms ac-

count for about 57% of total memory-card production.

More than 95% of the token cards manufactured were used by France **Telecom** as prepaid public telephone cards. This market is expected to continue to expand, according to **Dataquest**. Most European countries, including **Finland**, **Ireland**, **Norway**, **Germany** and **Spain**, have recently adopted this form of payment.

The study revealed that in 1989, four out of 10 smart cards produced were for banking applications, mainly in France. These memory cards are destined to replace the traditional magnetic-stripe credit or bank cards introduced at the end of the 1960s. While the production cost remains the same, the banking "smart card" offers two new features: security obtained through local control of a confidential code and the ability to use integrated circuits to incorporate additional services. After much hesitation, France has committed itself to this type of smart-card technology, essentially for security reasons.

However, the **Dataquest** study revealed that adoption of the smart card across Europe has not aroused enthusiasm from

banks, which believe that the savings from prevention of fraud are not sufficient justification alone for migration away from magnetic-stripe credit cards.

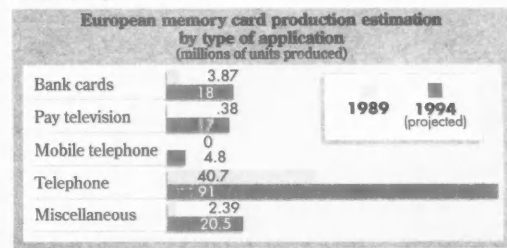
France and Norway, however, are proving to be exceptions to the conservative European banking rule. According to **Dataquest** analysts, French banks — with four million out of the 19 million cards equipped with chips — work closely with the strategic initiatives in information technology advocated by the French government. In Norway,

52% and 37% share of units produced, respectively. These figures compare with 86% for telephone applications and 8% for banking solutions in 1989.

Pay-per-view television, which accounted for less than 1% of the total market value in 1989, is expected to grow to 17% by 1994, according to **Dataquest**. The first fruits of prepaid TV viewing began with the British movie channel **Sky Channel** in February and with the **Canal Plus** station in France. French firms such as **Bull** are also focus-

Get smart

Banks and pay television are leading the surge toward 'smart' memory cards in Europe



Source: **Dataquest, Inc.**

CW Chart: **Paul Mock**

the fixed lines needed for on-line processing are so expensive in comparison with similar costs in the rest of Europe that smart cards are necessary.

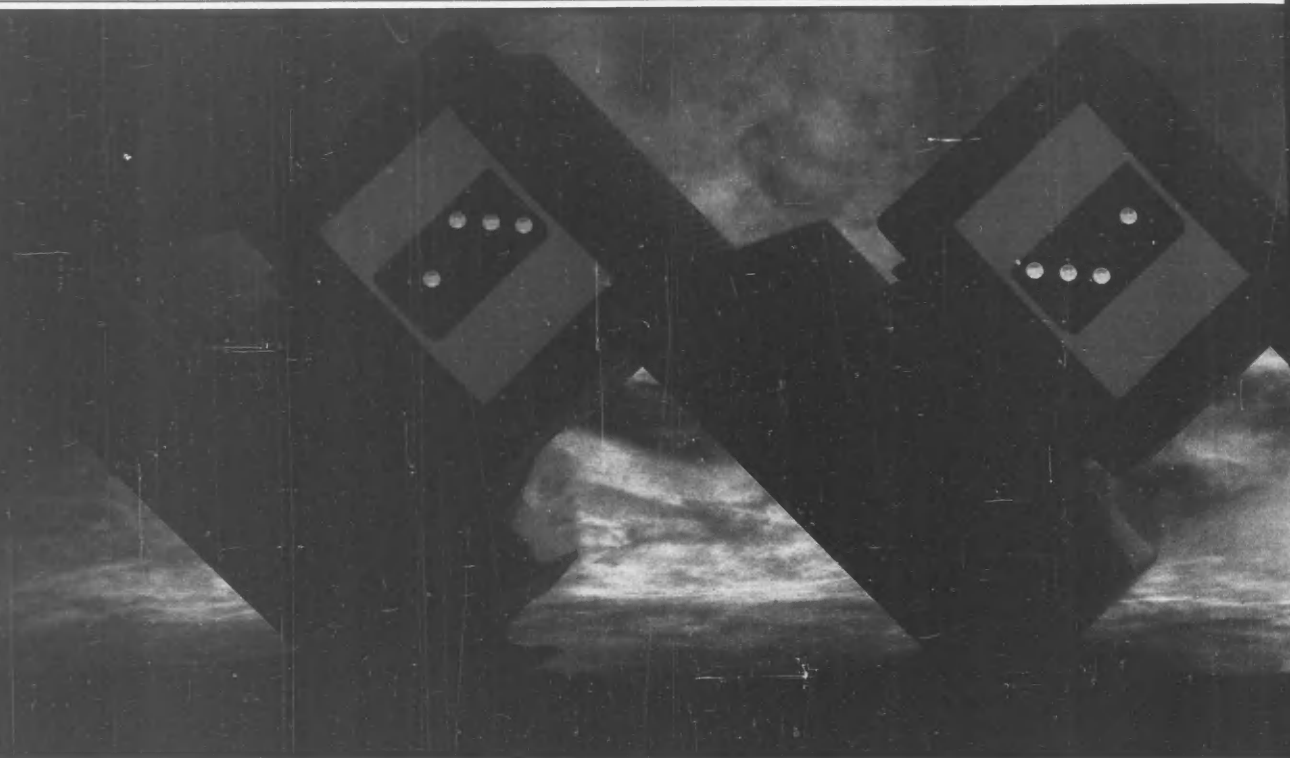
Telephone and banking applications will continue to monopolize the smart-card market at least through 1994, holding a

ing on this market niche.

"By the year 2000," said **Jonathan Drazin**, an analyst at **Dataquest Europe**, "we expect to see one card per human being in Europe."

*Philippe Rose is a writer at **Le Monde Informatique**, an IDG publication.*

Get AT&T EDI. Because if one



Here at AT&T, we know that an Electronic Data Interchange service is only as good as its component parts. That's why we've designed each part of AT&T EDI to be equally strong. Why does our EDI stand up to your business' needs better than any other? It's a matter of simple addition.

Network

AT&T EDI is part of the AT&T Global Messaging Network. This network is based on our patented "Message Transfer Architecture" that uses CCITT MHS X.400, the internationally accepted messaging standard. So you can easily link up with trading partners around the world. And you can send and receive encrypted data, ensuring the security of sensitive documents. Further-

more, the AT&T Global Messaging Network can be used not only for EDI but for electronic mail and enhanced fax.

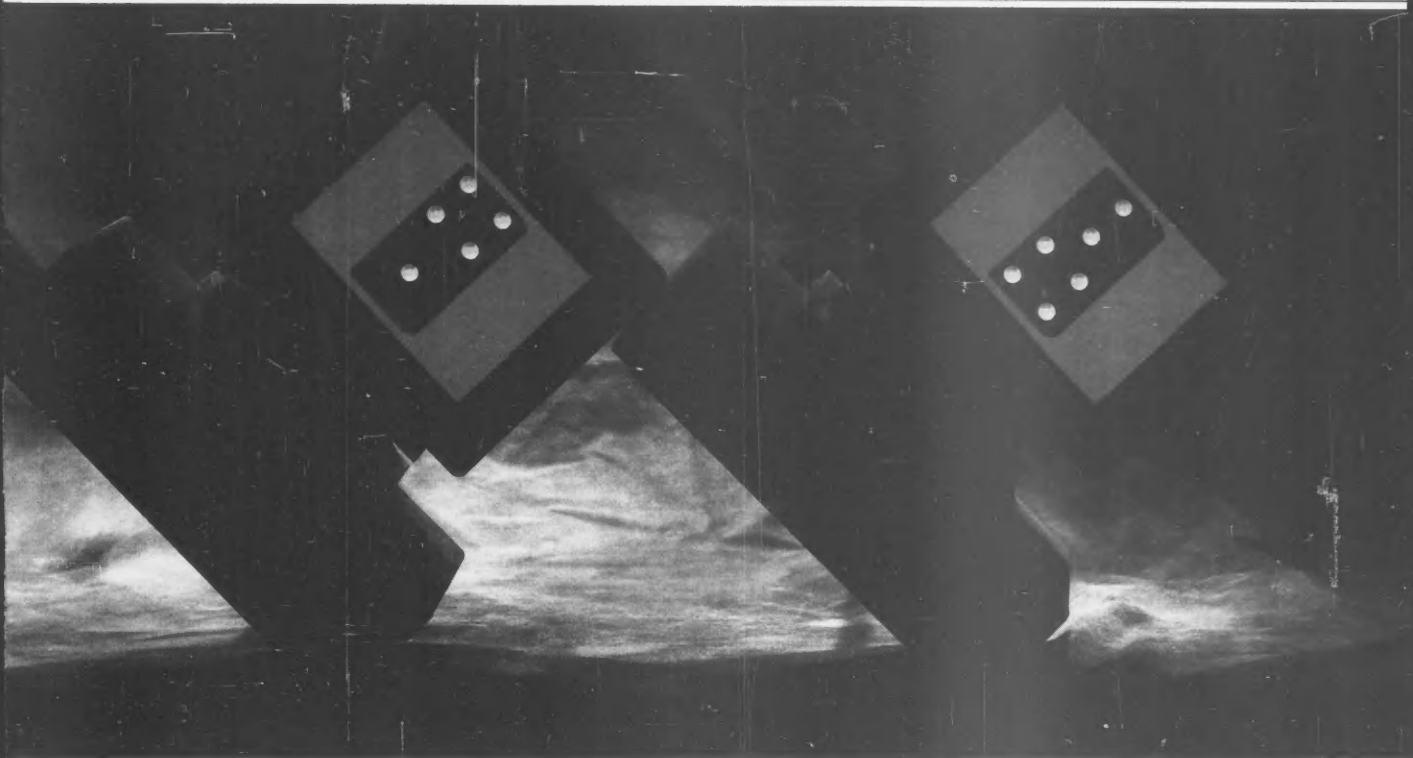
+Systems

Our unique open architecture means that our EDI can work with whatever systems you have, whether they're mainframe, mini or PC-based. We have the software and systems for you and your trading partners, no matter what size they are or how advanced they may be. And with our open architecture, we make it easy for your system to adapt as your business grows.

+Support

From the day you start talking with us about EDI, you can get an extensive range of support services. From

piece is out of balance, well, you know what'll happen.



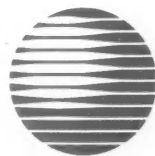
customized trading partner conferences and implementation seminars to on-site technical support. You also get the benefit of our extensive experience with EDI. After all, we've been using EDI here at AT&T for more than ten years.

=The best EDI.

So get the most advanced EDI network there is, with the most flexible systems and unsurpassed support. AT&T EDI. Because, on balance, the best EDI is the sum of superior parts.

Quality. Another AT&T advantage.

For more information, call your AT&T Account Executive or 1800 367-7225.



AT&T

The right choice.

Andersen guards No. 1 status

Consultancy exec enjoys firm's success; analyst notes its Achilles' heels

BY ELLIS BOOKER
CW STAFF

CHICAGO — "If they write a postmortem on Andersen Consulting a decade from now," declared George T. Shaheen, managing partner and chief executive officer, "it'll say, 'They didn't take advantage of the position they had.'"

Jealously guarding that position as one of the world's premier systems integrators appears to be Job No. 1 for Shaheen, who seems genuinely convinced by the message his firm routinely gives to its clients. "In the '90s, change will happen dramatically, quickly and will be very final," he said. "There will be winners and losers."

For the moment, however, Andersen enjoys an enviable and winning position. The company, one of the two business units of The Arthur Andersen Worldwide Organization, posted a 30%

revenue growth from \$1.44 billion to \$1.88 billion for the fiscal year ended Aug. 31. By the end of 1991, the firm hopes to have grown from 22,000 to 26,000 or 27,000 employees and have revenue in the \$2.4 billion to \$2.5 billion range, Shaheen said.

A holistic approach

Analysts credit Andersen with taking a holistic approach to consulting. The firm broadened its "main-line" business of systems engineering several years ago to include strategic consulting on the front end, training and organizational consulting — what Andersen refers to as "change management" — on the back end and facilities management in between.

"They are very smart in terms of pulling technology as opposed to pushing it," said Rich Peterson, president of Impact Research, Inc. in Upper Montclair, N.J. "They think process

rather than product; they think business rather than technology."

Nevertheless, Peterson noted at least two areas in which Andersen is marginally vulnerable. First, he said, there are Andersen's prices, which Peterson estimated are up to 20% — and in some cases 50% — higher than those of its competitors.

Given this, Peterson has a hard time accepting the theory that outsourcing customers get much of a break. "I just can't imagine Andersen supplying people at rates comparable to [those of] the in-house organization," he said.

Andersen overcomes such comparisons, Peterson said, by telling customers that it will bring in top talent to re-engineer

the data center — both its operations and applications — and make it more efficient and capable.

However, this leads to another vulnerability, he said: the fact that Andersen does not have enough "heavy hitters" to go around.

According to Peterson, this is a frequent complaint of customers who may be sold on Andersen on the weight of a very senior partner only to see the job handed to junior personnel once the contract has been inked. "You're sold the Cadillac, and the Plymouth shows up," he said.



Shaheen expects continued growth

Andersen's answer is that at Andersen, even the bottom of the corporate ladder is the top of the line. Grooming its staff — 9,000 employees in the U.S., 22,000 worldwide — is a cornerstone of the approach favored by the firm, which spends 8% to 10% of its earnings on training and has committed \$150 million to a five-

year retraining effort focused on the St. Charles, Ill., campus it acquired in the late 1970s.

Change, volatility and the strategic advantage companies can realize in such times are what fuel Shaheen's vision of Andersen and what prompts him to keep a watchful eye over his shoulder, he said.

On the short list of firms he considers competitors, Shaheen included General Motors Corp.'s subsidiary Electronic Data Systems Corp., IBM and European-based CAP Gemini Sogeti.

While gracious about these challengers, Shaheen managed to suggest that each lacks something, from a strong international presence to a diversified product line, that maps against Andersen's own suite of services and products.

Shaheen expressed confidence that Andersen will continue to see a stream of clients despite the worsening worldwide economy. "There will be scrutiny and rigid expectations [by customers]," he said, "but I do not feel information technology will be subjugated to a second-tier priority."

REPORTER'S NOTEBOOK

Adapso: Names, games, videotapes

BY PAUL GILLIN
CW STAFF

Few people recall what the old acronym stood for in the first place, and soon no one will even have to try: Adapso, the software and services industry organization, is changing its name to the Information Technology Association in a stated effort to "be a voice of the entire information technology industry," said Adapso President Luanne James at the association's semi-annual meeting early this month. However, the move may be prompted as much by a need to bolster sagging membership as by an effort to be an industry leader. Adapso lost about 100

members in recent years. It plans to take another stab at bolstering membership by recruiting hardware-only firms but is unclear how aggressive it plans to get. Outgoing Chairman David Eskra included the plan on a list of major Adapso goals in a speech to members. Certain Adapso hot buttons have become crucial to hardware as well as software firms. However, James noted, "I'm not going to tell you I expect a bunch of disk drive makers to suddenly join."

Despite a near-tragic incident in which a conference attendee was bitten by a tiger hired as part of the entertainment, the charity benefit roast of Dun & Brad-

street Software Chairman John Imlay went ahead. Among the zingers aimed at Imlay and others on the podium:

"As a child, little John developed an uncanny ability to locate his parents each time they moved to a new location" — Georgia Sen. Sam Nunn.

"At D&B, he's in the awkward position of being forgotten but not gone." — Attorney Robert Steed.

"[Knowledgeware Chairman] Fran Tarkenton attended Georgia State on a full athletic scholarship, which as you know includes the crayons and everything." — Steed.

Women now hold the top two po-

sitions at Adapso. Judith Hamilton, a partner at Ernst & Young, was elected to a one-year term as chairman earlier this month, and James was promoted from executive director to president.

One hit of the conference was a

five-minute rap video aimed at schoolchildren and promoting computer careers. The video, which was produced by an Adapso committee on a \$1,700 shoestring budget, uses rapid-fire film clips and a thumping rap beat to make careers in computing look hip and fun.

Seagate not planning to build optical disc drives

BY MAURA J. HARRINGTON
CW STAFF

Seagate Technologies, Inc. has no plans to incorporate any optical disc drives into its product lineup in "the foreseeable future," Chief Executive Officer and co-founder Alan Shugart told *Computerworld* during an interview at the Comdex/Fall '90 show earlier this month in Las Vegas.

"We have no optical disc drive efforts going on right now... and we don't think it's compatible with any of our mainstream markets," Shugart said. "As long as magnetic recording technology continues to increase... we don't see [optical] as a viable competitor."

In addition to already having a profitable established product line, Shugart said, Seagate is reluctant to dive into optical drives because the market is still a niche market, the governing standards are too few, and the prices are too high.

However, he said, that is not to say the firm won't profit from

other emerging technologies.

"Multimedia technology and the general growth of computers will cause our company to grow, too," Shugart said.

Indeed, Seagate has grown considerably in the past year. Including its acquisition of former Control Data Corp. division Imprimis, Inc., the company's net income grew from \$349,000 in 1989 to \$1.17 million in 1990. In addition, net sales almost doubled, from \$1.37 billion in 1989 to \$2.41 billion in fiscal 1990, ended June 30.

Shugart said there is plenty of room for the company to grow even more.

Seagate, he said, is focusing on very high-end technology for data-intensive users — nine-head magnetic storage devices, for example — and on increasing its position in the 2½-in. drive market in noncomputer applications.

"I think that by the better half of this decade, we'll see noncomputer applications that are just as exciting as [those for] computers," Shugart said.

Taiwan pours money into its own microchip development

BY CHRIS BROWN
IDG NEWS SERVICE

TAIPEI, Taiwan — Midway through a five-year semiconductor research plan, Taiwan has decided to redirect its energies into developing its own semiconductor mass-production process.

Taiwan's \$214 million submicron development plan, which was initiated in 1988 by the Ministry of Economic Affairs, has come under scrutiny during the last few months. Government planners said they want to see Taiwan develop its own semi-

conductor manufacturing process so that it can mass produce integrated circuits for the international market.

The new plan is backed by top-level government leaders. Shi Yan-hsiang, director of the government's Science and Technology Advisory Group, has been one of the supporters urging Taiwan to develop its own semiconductor production technology.

In the past, the state-sponsored Electronics Service & Research Organization (ERSO) has focused mostly on design of inte-

grated circuits. But it is now beginning to sign up foreign firms to help out with the submicron project. An August agreement between ERSO and U.S.-based Applied Materials Technology is the latest example.

Taiwan is looking particularly to develop its own fabrication process technology. One plan from the Ministry of Economic Affairs calls for the government and private industry to jointly invest in projects.

ERSO is expected to draw up a blueprint for the memory chip venture by 1992. Last year, Taiwan's Acer, Inc. and Texas Instruments, Inc. signed a joint venture to co-produce 4M-byte memory chips with Taiwan starting in the third quarter of next year.



If you're ready to replace your 1/2" reel to reel tape drives, turn the page.

Don't get confused. We're not giving up on 1/2" reel drives.

On the contrary. Our new PE (top) and GCR tape drives are the best values for your interchange needs.

Both are advanced designs that include an embedded SCSI interface, fewer moving parts and increased cache memory. Making them almost

three times more reliable than ever before. Consider also that we've installed 260,000 tape drives in the last 22 years. Reasons enough to stick with your 1/2" media for many years to come.

But we didn't stop there.

As you'll soon discover, we've developed the world's smallest and most

economical tape drive in 3480 compatible format—the exciting, new PC to mainframe interchange standard.

So, for the best 1/2" tape drives of the 90s, please call 1-800-4CIPHER in the USA, or 011-44-734-775757 in Europe.

Otherwise, turn the page.



The choice of the world's leading computer companies.

Dealer, reseller channels a must in Europe

BY MAURA J. HARRINGTON
CW STAFF

MUNICH, Germany — Information systems managers aiming to help their companies expand their computer operations in Europe, take note: Business in Europe is a whole different game.

So says Jochen Tschunke, founder and chairman of Munich-based Computer 2000, which sells to about 15,000 dealers and resellers in Europe.

The IS manager who plans to buy products in Europe, he said, will no longer be able to bank on buying directly from a distributor. The computer reseller channel is much stronger in Europe than in the U.S., Tschunke said. Moreover, he added, end users have more incentive to buy products — which tend to be between 10% and 15% more expensive — through this channel because it offers more end-user support.

"The reseller channel is much different here than [it is] in America," Tschunke said. "It is much more decentralized in Europe."

Tschunke, head of one of the fastest growing distribution

companies in Europe, said that mail order buying — the other apparent purchase option of choice in the U.S. — is also relatively unviable in Europe. "That doesn't really fit into the way Europeans do business, and it hasn't spread here like it has in the U.S.," Tschunke said.

How does one find a decent reseller in Europe? Tschunke may tell you to make sure the reseller's distributor is selling only quality goods to the resellers, as he himself claims to do.

Whatever Computer 2000 is doing appears to be good for the company's business. Service,

Bent on becoming Europe's largest peripherals and software distribution company serving the IBM Personal Computer and compatibles market by 1992, Computer 2000 has a significant lead on many of its German counterparts, most of which have revenues hovering in the \$65 million to \$100 million range, according to Doug Kass, a distribution and retail chain analyst at Dataquest, Inc., a market research firm based in San Jose, Calif.

Competition is increasing from U.S. distribution giants such as Ingram-Micro D Corp. and Merisel, Kass said. However, Tschunke claimed that Computer 2000 has an edge because it is a European company with an understanding of the European way of doing business.

"Many other distribution companies do not account for cultural differences when they are making their forecasts," he said. "For example, some European companies will laugh at you if you tell them you want their

money before 180 days after the sale," Tschunke said, adding that it would be a cultural faux pas to expect the money.

Founded in 1983, Computer 2000 claimed that it has always been profitable, with a 128% increase in total sales volume for the 1990 fiscal year.

Posted year-end revenue for the company jumped to 600 million deutsch marks, compared with 262.8 million deutsch marks in total sales volume for fiscal year 1989, according to Tschunke.

"We are positively convinced that we will go over 1 billion deutsch marks in sales by the end of 1992, which is about \$700 million," Tschunke said.

With operations in Germany, Switzerland, Austria, Spain, the UK, Belgium and the Netherlands, Computer 2000 has no plans to slow down its growth. Tschunke said the company plans to expand its operations into Eastern Europe, Portugal, Italy and France through acquisitions and alliances.

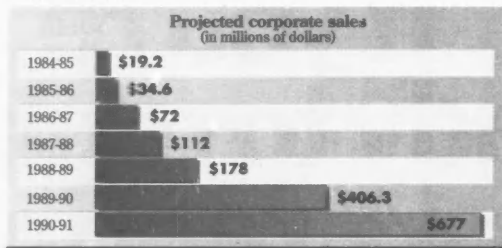
While he did not foreclose the option of expanding to the U.S., Tschunke said the company's main focus rests on Europe.



Tschunke will buy products in Europe

Way to go

Munich-based Computer 2000 credits its rise to its ability to deal with dealers and resellers



CW Chart: Paul Mock

Across the Atlantic, he said, this is how it goes: Distributors buy from manufacturers and sell to the retail chain, which in turn sells to end users, usually at prices 10% to 15% higher than the cost of the same product in the U.S.

support and one golden rule — which is never to compete with systems manufacturers or dealers — has brought the company's annual revenue up to an estimated \$400 million for fiscal 1989, which ended in September, Tschunke said.

Brownstone

FROM PAGE 77

out of college while working together in the early 1980s at Arthur Andersen & Co.'s technical services organization — the predecessor of today's Andersen Consulting.

Working on large-scale development projects for big clients such as First Boston Corp. in the early days of DB2, the two perceived a need for better development tools.

"Instead of doing it with manpower, the way Andersen would, we thought we could do it with software," Brown said.

Thus were born two unlikely entrepreneurs, who left Andersen to consult by day and code by night in their equivalent of the legendary Jobs/Wozniak garage: Brown's New York studio apartment. "We started as technicians, and we still are," Stone said. "You can get us more excited about a new technology innovation than about the dollars coming in next quarter."

Brownstone, which forecasts revenue of about \$2.2 million this year, has a history that is almost too storybooklike to believe. "When we went to open our first corporate bank account and they asked us for a deposit, Lew and I each reached into our pockets and pulled out a \$20 bill," Brown recalled with a laugh.

Since then, spurning the

overtures of venture capital firms, Brownstone has been self-financed. It has released an enhanced version of its core DDS product every year and developed three add-on products.

Along with several moves into successively larger Manhattan office spaces because of growth, it has opened sales offices in Philadelphia and Chicago and plans a San Francisco opening by the end of the year. The firm also runs a small development center in Norwalk, Conn., where programmers working on new products can "hibernate," Brown said.

Bigger than both of them

Brown and Stone admitted that their company's size posed a marketing challenge in the early days, with some customers requesting a credit check on their finances from The Dun & Bradstreet Corp. "But that doesn't happen anymore," Brown said. "The typical user assumes we're much larger than we are."

And bigger is not necessarily better, said Brownstone user Lucy Cole, data services manager at Hewlett-Packard Co.'s Information Systems Group in Palo Alto, Calif. "Smaller companies tend to be more responsive, and that's a very positive thing," Cole said. "They're unlikely to promise what they can't deliver. With Brownstone, we've been able to rely on their delivering what they say they will."

Brownstone's three add-on

products to DDS in the past three years are DB2 Admin/Solution, a suite of tools for DB2 administration; IMS Admin/Solution, a comparable tool set for the older IBM database management system; and IE Admin/Solution, a link between Knowledgeware's workstation-based programming and Brownstone's DDS repository on the mainframe.

Future product plans include workstation-based graphical interfaces to Brownstone's mainframe tools. The company is also considering links to the development environments of other leading CASE vendors such as Index Technology, Inc. and Bachmann Information Systems, Inc.

But the biggest question looming over Brownstone's future is a few miles north in Westchester County, N.Y. When IBM fills in the gaps of AD/Cycle and delivers its full repository, will Brownstone's niche disappear?

"We will continue to provide a dictionary and tools on top of the IBM Repository," Stone said. "We don't feel like we're in the path of the steamroller."

"When we started," Brown added, "the sky was all blue. A lot of CASE and DB2 tools have come out since then, but we have adapted. And we have twice as many ideas for new products now as when we started. We see our future role as something like software systems integrators."

Moreover, it is not a foregone

conclusion that Brownstone users will migrate to the IBM Repository when the day arrives. Early Brownstone customer Pacific Bell in San Ramon, Calif., is "in a constant state of evaluation" about the migration decision, systems analyst Bob Jones said.

INTERNATIONAL BRIEFS

Olivetti cuts deeper

In the face of tough times in the European computer industry, Italy's Ing. C. Olivetti & Co. is reportedly about to cut another 7,000 jobs from its worldwide work force. Olivetti, which has 57,000 employees worldwide, has already cut 3,500 this year and 2,000 in 1989 as part of a major restructuring plan. During the past two years, the firm reorganized its business into four operating firms to halt slumping profits caused by declining demand, stiff competition and the strong lira.

Taking notes

An alliance of 47 Taiwanese firms is gearing up to launch what will soon be the standard notebook computer for Taiwan. The firms are aligning Taiwan's state-sponsored Computer & Communication Laboratory to agree on a design specification

and standard parts. Meanwhile, the notebook made its debut at Comdex/Fall '90 in Las Vegas.

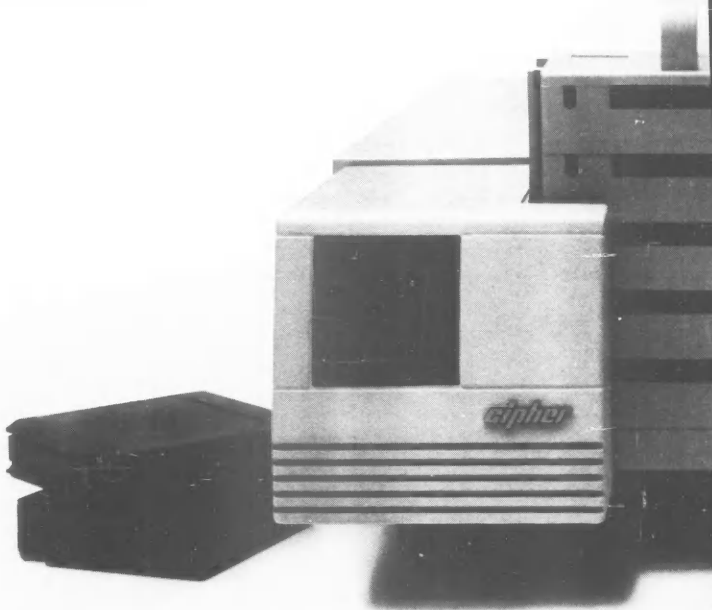
Universal Unix

AT&T is branching out in Asia to license its latest version of Unix to hardware firms and to win over Unix software developers. Tokyo-based Unix Systems Laboratory Pacific, an AT&T start-up, has set up offices in Taipei and Seoul, South Korea, over the last two months. The firm has already been operating in many Asian markets for several years.

Submarine nets

NEC Corp., Fujitsu Ltd. and Ocean Cable Co. have signed a contract in Brunei to construct an undersea fiber-optic cable network linking Brunei, Singapore, Malaysia and the Philippines, all members of the Association of Southeast Asian Nations. The Brunei-Singapore connection should be complete by November 1991, with the line from Brunei through Malaysia and the Philippines operative two months later.

If you're not, go back a page.



Introducing Tapexpress™, the world's smallest and most affordable 3480 compatible tape drive. As you know, 3480 technology is the interchange standard for mainframes. With Tapexpress™, this format will also become the standard that links mainframes to midranges and PCs.

Tapexpress™ has the fastest backup and restore of any desktop tape drive

available today, thanks to its 1.5 MB per second transfer rate and 2.2 gigabyte automatic cartridge loader. But what's even more remarkable, we've made all of this fit into a space that's about the size of a dot-matrix printer.

And when you consider the storage benefits, capacity and the fact that operators will no longer idly wait to

change tapes, the reasons to switch to this new 3480 technology become even more compelling.

If you have any questions, call 1-800-4CIPHER in the USA, or, in Europe, 011-44-734-775757. Or stop by booth #1816 at Comdex.

If you're unsure, you can always go back a page.



The choice of the world's leading computer companies.

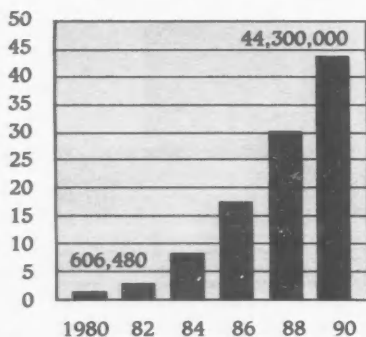
If you recruit computer professionals, we have their numbers.

We've probably spent more money researching this market than any company in America. And what we've learned can help you.

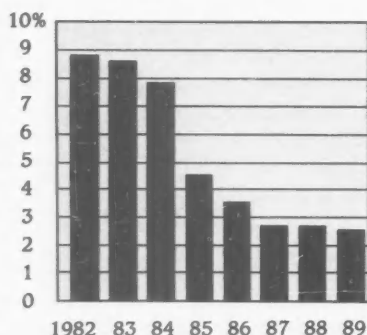
Number of computers up 7,300% in 10 years.

At this pace, how will you meet the demand for staff in the future? One

More computers are demanding more talent*



Fewer campus freshmen are choosing computer careers**



source is America's campuses. But with college freshmen interest in computer careers dropping more than two-thirds since 1982, you'll need to find other sources. Call us. We'll tell you about them.

Only 20% of computer professionals actively seek jobs through sources like local classifieds.

Which, according to figures from our annual Job Satisfaction Survey, leaves 80% of the market largely unreachable through local papers. Yet easily reached through professional newspapers. Our research can show you how.

Over 213,000 professionals with CICS operating system experience are reachable with a single advertisement.

And so are hundreds of thousands of others with skills from DB2 to IBM S/38 to Unix. How? Call us and we'll show you.

Computerworld reaches professionals with key skills—a few examples from our survey—

Skill/Product	Product type	Experts in Computerworld's Audience
IBM PC compatible	hardware	547,488
IBM (all but PC)	hardware	462,817
Digital Equip. Corp.	hardware	239,551
MVS	operating system	224,364
Cobol	language/utility	396,565

Free reports!

Our skill survey reveals demographics.

Computerworld just completed a major survey of computer skills among its readers. The results can help you target your recruiting. Call John Corrigan at Computerworld for your free report.

We conduct the most comprehensive salary survey in the field.

Co-sponsored by the Data Processing Management Association, the annual report is available to you at no charge.

If you want to check out our numbers, just call us at this one: 800/343-6474 (in MA, call 508/879-0700). Ask for John Corrigan, Classified Advertising Director. Or write to him at Computerworld, Department N, 375 Cochituate Road, Framingham, MA 01701.



COMPUTERWORLD

Where the qualified candidates look. Every week.

Sources: *International Data Corporation **American Council on Education

COMPUTER CAREERS

The viability of telecommuting in IS

BY KEVIN BURDEN
CW STAFF

Telecommuting — working at home using a personal computer and modem linked to the office — is allowing many professionals to boost productivity while avoiding the grind of daily commutes. But is it appropriate for all types of workers?

The answer for information systems professionals depends greatly on the nature of their jobs and their managers' attitudes toward telecommuting. For example, Pacific Bell in San Francisco, which has had a formal telecommuting program in place since 1984, is a strong advocate of telecommuting because it allows employees to maintain flexible hours.

"When you have someone who can solve a problem in the middle of the night, it's much easier for them to roll out of bed and walk 20 steps to their computer than hop in the car and drive 20 miles to the office," says Steve Cotler, Bay Area vice

president at Pacific Bell.

At Blue Cross/Blue Shield in Washington, D.C., Amee Nable, a systems programmer, sees a similar advantage: "Because our computer system stays on-line 24 hours a day, I can catch up from home anytime if I fall behind."

Increases in productivity, although difficult to measure, are often cited as a key benefit of allowing employees to work in outlying locations.

Most companies can expect a 20% productivity hike from telecommuters, regardless of the type of work, says telecommuting proponent Gil Gordon, president of Gil Gordon Associates in Monmouth Junction, N.J. Companies also report enhanced work quality, heightened employee morale and lower relocation expenses as a result of telecommuting policies.

Telecommuters say that their overall working conditions vastly improve: They can spend more time with their families by not having to make a round-trip of as

much as two hours per day, and they claim to feel less stress.

Even if a company or manager gives the green light to telecommuting, employees must determine whether telecommuting is viable for the types of jobs they perform.

Workers whose physical presence in the office isn't necessary for their jobs are at a clear advantage. Programmers and analysts, for example, can create the essential materials from their offices in a briefcase and effectively work at home on their own PCs. Even some IS managers find they can telecommute on a part-time basis.

However, telecommuting is not a utopia, and it can cause some problems. First, there is something to be said for working in an interactive office environment. Many offices foster a team atmosphere in which an employee can walk 10 steps to a neighboring cohort to ask a question that might take 10 minutes or longer to answer by calling from home.

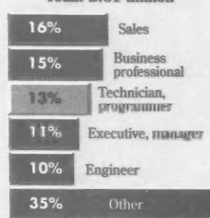
Although the more autonomous the better, telecommuting is most conducive to those workers who don't need frequent contact with the outside world. Unfortunately, a good portion of IS jobs are service-oriented. Many IS executives act as firefighters for the host system and must be on-site.

According to Diane Bengston, IS human resource director and a telecommuting manager at The Travelers Corp. in Hartford, Conn., those professionals who support highly technical systems are just

Winning the bronze

IS positions are the third most common telecommuting job

Percent of telecommuters in knowledge working occupations
Total: 2.61 million



Source: Link Resources CW Chart: Paul Mock

not suited for telecommuting.

Getting management to buy into telecommuting is easier said than done, says Jack Nilles, a telecommuting consultant: "IS managers feel that the work won't get done unless their people are huddled around each other."

The county of Los Angeles, which employs 8,000 people, reports that only 10 of its 700 telecommuters are IS workers. "Our IS department has been slow

in starting telecommuting, but that's been a management issue," says Margery Gould, the county's project manager for the telecommuting program.

The problem is that managers have to make some big adjustments in their work styles, Nilles says. All of a sudden, they can't see what their employees are up to or how long they're at lunch. They must base management decisions on end results of the work performed.

Another pitfall to telecommuting is the difficulty of setting a worker up at home with the proper equipment. While many employees in the IS profession already own PCs, they're accustomed to working on state-of-the-art technology at work.

While telecommuting isn't a revelation for all, it does offer workers and their companies some undeniable benefits. And although office buildings are not expected to empty out, experts predict that in the future it won't be hard to find companies testing telecommuting.

Burden is the research coordinator at Computerworld.

If the shoe fits...

Autonomous, computer-intensive positions fit the telecommuting bill best: market researchers, salespeople, journalists and IS professionals. But even within those professions, there's a fine line between who is suitable and who isn't. The following requirements are key attributes of a successful telecommuter:

- Work can be transported to and from the office.
- Interpersonal communication is not vital to the job.
- The employee is an independent worker.
- The tasks and deliverables are clearly defined.
- Work activities are measurable.
- The work is content-oriented, not process-oriented.
- The worker has a working knowledge of a telecommuter's most valuable and useful tools — the PC and modem.

KEVIN BURDEN

AS/400 S/38

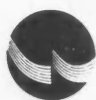
GET TO THE HART OF THE BUSINESS...

...With Whitman Hart, the largest diversified technical services company (dedicated strictly to the AS/400 and S/38 systems) in the country. Providing technical support to many of the top Fortune 20 companies in America, we are the consulting experts, committed to mastering technologies, attending to details and creating solutions. Our accelerated growth and phenomenal success have created a need for talented Data Processing PROFESSIONALS to share in a future of significant challenge and reward in a highly progressive team environment.

We currently require individuals with 2+ years solid System 38, or AS400 experience, RPG III and proficiency in any of the following:

- Technical Consulting
- Design
- Education & Training
- Data Communications
- Project Management
- Product Development

POSITIONS ARE CURRENTLY AVAILABLE IN CHICAGO, LOS ANGELES AND INDIANAPOLIS.



Whittman-Hart

The Leader in IBM Midrange Solutions

Get to the HART of challenge and reward at Whitman Hart. We offer one of the finest compensation packages in the industry, including high earning potential, project diversity, incentives, paid insurance coverage, relocation allowance and other impressive benefits. Please send your resume in strict confidence to: Jared Bobo, Director of Recruiting, Whitman Hart, 377 East Butterfield Road, Suite 425, Lombard, IL 60148. (708) 971-2270. Equal Opportunity Employer M/F.



USA FUNDS

COMPUTER PROFESSIONALS IT'S PRIME TIME AT USA FUNDS!

Join the excitement with the nation's leader in student loan financial services.

Due to our continual success, we have created new opportunities to assist in the expert operation and expansion of our state-of-the-art information systems. We offer a competitive salary and comprehensive benefits package.

OUR ADVANCED TECHNICAL ENVIRONMENT INCLUDES:

- IBM 3090-200 running MVS
- IDMS/R database system
- A sophisticated robotics tape librarian
- AS/400 mini-computer technology
- A nationwide computer network linking over 1500 terminal devices to our corporate data center
- CASE tools such as Excelerator
- Information Engineering techniques

SYSTEMS DEVELOPMENT MANAGER

Qualifications:

- 4-5 years experience as a Project Manager
- Supervised 10 or more DP professionals
- Experience in the use of Systems Development Life Cycle Methodologies

INFORMATION ENGINEERING MGR

Qualifications:

- Expertise in Systems Development Life Cycle Methodologies such as Information Engineering
- Experience in leading or supporting project teams in use of methodology

SYSTEMS ANALYST

Qualifications:

- 3-4 years experience as a Project Leader
- 2 years high level programming experience
- Experience in the use of Systems Development Life Cycle Methodologies

PROGRAMMER/ANALYST

Qualifications:

- Strong COBOL programming skills
- Exposure to database and on-line technology
- 2 years IBM mainframe experience preferred

If you have a B.S. in Computer Technology or relevant work experience and want the right career opportunity, submit your resume and salary requirements in complete confidence to:

United Student Aid Funds, Inc. • 8115 Knue Road
Indianapolis, IN 46250 • Attn: Human Resources

or call our Technical Recruiter for a confidential interview (317) 845-7696
Equal Opportunity/Affirmative Action Employer

ONE COMPANY.

Keane employees enjoy what all technical professionals want. The stability of full-time consulting work. State-of-the-art technologies including fourth-generation languages, databases and productivity tools. The opportunity to apply their application expertise at Fortune 1000 manufacturers, insurance companies, banks, services companies and government agencies. The chance to work for the premier project-oriented consulting company in the industry. Technical, management and project management training. Competitive salaries, comprehensive benefits, 401K plan, tuition reimbursement, and vacation condominiums. For one career offering endless possibilities, consult with Keane.

PROGRAMMERS/ PROGRAMMER ANALYSTS

If you're a computer programmer with 2-5 years' experience in the following areas, we want to hear from you.

IMS	TELON	IDMS
COBOL	ADABAS	DCS
DB2	System 38	CICS
AS 400	ORACLE	WANG
PL/1	ASSEMBLER	C

For more information, call Greg Alleyne at 1-800-899-5326 or send/fax your resume to his attention at (301) 752-7695, Keane, Inc., 36 So. Charles St., Suite 2350, Dept. CW, Baltimore, MD 21201. An equal opportunity employer.

ENDLESS POSSIBILITIES.

Connecticut
Delaware
Florida
Georgia
Illinois
Indiana
Maine
Massachusetts
Maryland
Minnesota
New Hampshire
New Jersey
New York
Ohio
Pennsylvania
Rhode Island

Where do the best computer professionals look for jobs?

Right here. In fact, more computer pros read more computer recruitment ads in *Computerworld* than in any other newspaper.

Talk to the best. Run your ad in *Computerworld*. For more information or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

PROJECT MANAGER: Spreadsheet Software Group; 40 hrs/wk, no overtime; 8:30 a.m. to 5:00 p.m.; \$50,000.00 per year. Manages design, production, validation and upgrading of Scientific/Financial Spreadsheet-graphic modeling product for VAX, IBM pc and Macintosh Computers. Supervises team of four programmers, assigning tasks according to their ability and familiarity with programming advanced mathematical functions used in scientific and advanced statistical analysis. Develops the overall architecture of the Scientific/Financial spreadsheet-graphic modeling programs. Mentors programmers in advanced mathematical concepts (Statistics, Trigonometry, Matrix and Vector Algebra, Calculus, Statistical Methods, including tests for variance, probability and correlation). Sets deadlines, and balances work assignments to meet product release deadlines. Designs the test methodology to validate the integrity of the advanced mathematical functions programmed by team members. Recommends changes to programmers' work product to make more integrated with the overall project specifications and standards. Uses IBM pc/AT, Micro Vax-4, Macintosh-H, debuggers, Pascal Compiler, C Compiler, Macro and assembly language compilers (Vax, 68000, 68016), Inter-M.S. either Mathematics, Statistics or Computer Science required. Three years in job offered or as systems analyst required. Applicant must have completed courses following topics: mathematical subjects: Solid Geometry, Trigonometry, Matrix and Vector Algebra, Calculus and Statistical Methods. If Applicant's experience is as a Systems Analyst, it must include experience in management of team of programmers. Major field of study requirements is in the alternative. Any of the three advanced degrees is acceptable. Experience requirement is also in the alternative. Send resume to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, Illinois 60605. Attention: Joan Sytkus, Reference #V-IL 1671-S, NO CALLS. AN EMPLOYER PAID AD.

Information System Design - Chicago. Design/develop tools, identify changed areas of computer syst. software to optimize efficiency of the system. Analyze oper. pbms. in existing software pbms/implement software solutions. Perform system test using shell pgms on UNIX oper. system to carry out test procedure. Create database pgm using SQL in test applications. 6 mos exp or 1 yr exp Data Base Design, and 6 mos exp or training in Shell, UNIX, SQL. Master of Science/Math or Comp Sci 9-5PM 40 hrs. \$32,400/yr. Resumes to: Illinois Dept. of Employment Security, 401 South State St., 3 South, Chicago, Illinois 60605. ATT: Len Boksa, REF #17948.

LONG TERM OPPORTUNITIES

...exist immediately
for experienced
(min. 2 yrs.) programmer
analysts with
the following skills:

- TANDEM
- IBM
- VAX

If you would like
more information
about a career with
a leading edge DP
Consulting Firm,
please call, write or
fax:

**Pittsburgh Business
Consultants, Inc.**
411 R. Avenue, Suite
1431A
Cityview 1 of Commerce
Building
Pittsburgh, PA 15219
412-491-0714
1-800-722-9820
FAX 412-391-0478
EMPLOYER PAID AD

Computer Software Development Engineer wanted to design, develop, implement software and explore algorithms for CAM and computer-aided system applications; search for feasibility and provide possible solutions for system integration, hardware and software set up for automated factory utilizing knowledge in computer science, image processing and pattern recognition for automotive apparel industries; Requires M.S. degree in Electrical or Computer Engineering and Master's degree level courses, one each in Pattern Recognition, Advanced Operation System, Design Digital System, and Sequential Machines; \$30,000.00 per year; 40 hours per week. Send resume to: 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #96490 "Employer Paid Ad"

Software Design Eng-Chicago. Design/develop software pgms to perform CCITT signaling system. No 7 functions on switching systems. Solve compatibility pbms between old & redesigned generics to assure smooth communication. 1 yr exp in call processing software devlpt, system lab usage, software testing and of CCITT signaling system No. 7. A protocol for two systems to communicate 1 yr exp \$45,000. yr 40 hrs. 9-5PM Baccalaureate Comp Sci. or Elect Eng. or applied math. Send resumes: Illinois Dept. of Employment Sec., 401 S. State St. - 3 South, Chicago, Illinois 60605. ATT: L. Donaghy, REF #V-IL 1905-D. No calls. AN EMPLOYER PAID AD.

RECRUIT THE BEST!

Place your ad in regional or national editions of *Computerworld's* Computer Careers section. For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Looking for qualified computer professionals?

Look no further. More than 612,000 computer professionals read *Computerworld* every week. And you can reach all of them - or just the ones in your region - with a regional or national recruitment advertisement in *Computerworld's* Computer Career section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Percival, 508-879-0700;

NEW YORK: Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090;

WASHINGTON, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031, Katie Kress, 703-573-4115;

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, Patricia Powers, 708-827-4433;

LOS ANGELES: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164;

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.



**Weekly. Regional. National.
And it works.**

An IDG Communications Publication

Data Processing

CYBERTEK IS TAKING
ON THE FUTURE...

CYBERTEK...

- An impressive growth rate
- Flexibility & financial stability
- Working to become the number one information systems management company in the life insurance industry

We're currently seeking the following professionals that can work with the following:

IBM System Software:

- MVS/XA, CICS, TSO, VSAM, VIASOFT

Programming Languages:

- COBOL/COBOL II/ALC

SENIOR PROGRAMMER ANALYST

5+ years' mainframe, COBOL or ALC experience required; experience with life insurance software desired.

PROGRAMMER ANALYST

1-3 years' IBM mainframe experience in COBOL or ALC.

MVS/XA SYSTEMS PROGRAMMER

1-3 years' experience in IBM utilities and software installation. Knowledge of CA products a plus.

PC SUPPORT SPECIALIST

3-5 years' PC experience. Troubleshooting client problems with hardware, operating systems, CYBERTEK and other vendor software. (Position is located on-site at our client.)

We offer 401(K) profit sharing, a stock purchase plan, education and training, and the financial rewards that result from working with an innovative leader. For consideration, please send your resume with salary history to: CYBERTEK CORPORATION, Attn: Mark E. Jeske/Jeffery E. King, Dept. CW/1190, 935 Lakeview Pkwy., Ste. 190, Vernon Hills, IL 60061; call (708) 816-4400 or FAX resume to (708) 816-4410. We are an Equal Opportunity Employer.

Opportunities also available in Los Angeles and Dallas.

CYBERTEK.
CORPORATION

Systems analyst - Use SQL language to write, develop & modify code supporting various applications utilizing relational database. Use C language to create nec. command tools/support execution of switching syst. relation data bases in a UNIX oper. syst. environment. Maintain/enhance time sharing network syst. incl on-line access to several generic data & restrictive access to several other relational databases in which the data will be processed in most timely/inexpensive manner. Bachelor/Comp Science 1 yr exp 9-5PM 40 hrs. \$27,500 yr. Send resume in dupl. Illinois Dept. of Employment Sec. 401 South State St. - 3 South, Chicago, Illinois 60605. ATT: L. Donegan, REF #19280, An Employer Paid Ad.

SQL/DS DATABASE ADMINISTRATOR

Administrative Information Systems and Services
University of Illinois

Administrative Information Systems and Services in Urbana-Champaign has a permanent position available immediately for SQL/DS Database Administrator. (This position carries the academic professional title of Research Programmer.) Responsibilities include the development and maintenance of computer application systems in a mixed environment, and/or technical support for that environment. This environment includes SQL/DS, VM, PROFS, RAMIS and REXX EXEC (DB2 experience acceptable). Although full-time, this position is flexible enough to allow motivated individuals to take University courses.

Position requires a Bachelor's degree in Computer Science, Information Systems, or a related field, and a minimum of 2-3 years experience in data processing. Preference will be given to candidates with experience or training in VM, SQL/DS or DB2.

Salary range \$32,000 - \$38,000, commensurate with qualifications and experience. For full consideration, latter of application specifying position title, resume and three references should be submitted by December 14, 1990 to:

L. Maxine Hayden
Administrative Information Systems and Services
911 S. Sixth Street
Champaign, IL 61820

The University of Illinois is an Affirmative Action/
Equal Opportunity Employer.

**PROGRAMMER/
ANALYST POSITIONS****SYSTEMS
PROGRAMMERS**

With at least 3 years experience in

- * IMS DB/DC, DL1 * CICS
- * NATURAL * ADABASE
- * PL1 * COBOL
- * DB2/SQL * TANDEM
- * VM/VS * RPG/III
- * VAX/VMS * IDS/ADS/O
- * FOCUS * C LANGUAGE

Please Send Resume to:

MSI Management Solutions, Inc.
1416 South Third Street
Louisville, KY 40208
502-634-1387

CONSULTANTS

We give you straight talk and the majority of the bill rate. Our current needs require a minimum of 2 years practical experience in the following:

Prime: Sys. Admin; Prog./Anal; Information, Info/Basic

Tandem: Base24/Action 2000

Novatek: GCOS 3/8, COBOL, IDS/II

VAX: COBOL, Fortran; Oracle, RDB, Ingres, Informix; Systems Managers

IBM: IMS DB/DC, IDS/ADS/O, DB2, Datacom/IDEAL, ADABAS/NATURAL; System 38/AS400; Symp

MISC: UNIX/C, C++, Tesseract, Easel, Micro/Focus, 3COM, Wang VS, HP3000

JMRoss & Assoc., Inc.

P.O. Box 1724
St. Louis, MO 63043-0621
(314) 434-1976
FAX (314) 434-0952
NACCB Member

**A Terrific
Opportunity**

Computer Consulting Group has immediate openings on its consulting staff for talented Programmer/Analysts with 2 or more years experience. Excellent salary & benefits. We're especially seeking

- DB2/CICS
- INGRES
- C/UNIX
- OS/2
- NATURAL
- IBM 30XX
- DEC VAX

Computer Consulting Group

Contract Professional Services

Research Triangle Area

4109 Wake Forest Rd
Suite 307
Raleigh, NC 27609

1-800-222-1273
FAX (803) 738-9123

GROW

With The Software
Industry's Most
Exciting Company!

Big things are happening at SOFTWARE AG.

If you read the computer trade press, you've seen our name a lot recently. In over twenty years, SOFTWARE AG has become one of the largest independent software companies in the world by helping customers meet their information needs. Now, SOFTWARE AG has unveiled a suite of advanced methodologies and software engineering tools for client/server computing, all driven by a unique technological vision and guided by a special pride in sharing the success of our customers. The same vision that inspires our future growth can also be your key to professional and financial rewards.

To help us grow, we are seeking top-notch professionals for the following positions:

**PROJECT LEADER/
SYSTEMS ANALYST**

Dallas, TX

You'll lead specific projects and maintain on-time, on-budget, profitable delivery while meeting the customer's requirements; plus, evaluate client needs and identify and document software/hardware solutions for medium to large scale projects.

Your specific responsibilities include establishing project design and managing development and implementation process; supervising programmer/analysts and systems analysts as assigned during all phases of projects; conducting extensive client interviews; preparing proposals according to standards; determining project feasibility and alternatives for system design/implementation plan; and directing the design, programming and testing of specialized software.

Qualified candidates need a degree in Computer Science, Information Systems, or equivalent work experience. Plus, 5 or more years direct application experience required, including 3 or more years detailed system design on medium to large NATURAL projects, with ADABAS; 1 or more years technical supervision experience; significant experience in IBM environment (VAX a plus); project management experience; and ability to learn SOFTWARE AG products quickly. In addition, a proven ability to evaluate needs and translate them into a logical and practical software plan is required. Excellent analytical, interpersonal,

oral and written skills also needed. Some travel required.

SYSTEMS ENGINEER MANAGER

Reston, VA (Suburban Washington, DC)

You will be responsible for effective coordination of pre- and post-sales functions to maximize regional revenue potential and ensure margin opportunities are obtained. Plus, you'll oversee execution of demonstrations, presentations, installations, education and problem resolution; supplement regional SSR resources as required; and maintain in-depth knowledge of competitive products as related to solving business problems.

To qualify, you need a minimum of three years experience with SOFTWARE AG products, excellent interpersonal and communications skills with solid understanding of technical management and business principles.

SYSTEMS ENGINEER

Reston, VA; Atlanta, GA

We'll count on you to provide support to sales representatives in pre- and post-sales activities; perform and develop presentations of products to prospective users; conduct product installations and maintenance and assist customers in use of products; acquire broad knowledge of competitive products; plus, prepare and present detailed answers to prospects' technical questions.

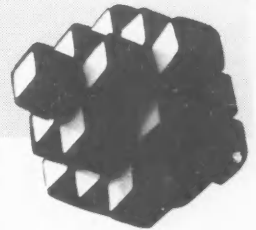
Applicants need to have 3 or more years experience with all SOFTWARE AG or related products; excellent organizational, interpersonal and communications skills; functional knowledge of IBM operating systems, teleprocessing monitors and utilities; plus, DBA experience desired. Some travel required.

If you're experience and objectives fit the challenges listed above, please send your resume and salary history to: Dept. CW126JSM, Human Resources, SOFTWARE AG of North America, Inc., 1190 Sunrise Valley Drive, Reston, VA 22091. An equal opportunity employer.

SOFTWARE AG

Solutions Worldwide

SUPERIOR KNOWLEDGE MAKES THE MOST DIFFICULT PUZZLES SOLVABLE



At Computer Horizons, we're renowned for helping some of the most prestigious Fortune 500 companies solve the most puzzling problems they have in data processing and computer systems.

Our Great Lakes Region is looking for Senior Programmers / Analysts with two to five years experience in:

- DB2/SQL
- IMS DB/DC
- CICS
- TELON/APS
- COBOL/PL-1/BAL
- AIX/UNIX/C
- CASE TOOLS
- ORACLE/INGRES
- HP3000/TRANACT
- DEC VAX, COBOL

Become part of the solution... You'll enjoy above average salaries and a superior benefits package, including health, life, dental and disability insurance, tuition refund, 401 (K) and exceptional room for

growth. For prompt consideration, FAX your resume to: (313) 641-1523 or mail your resume to the attention of: James Abbott, Computer Horizons Corp., 5435 Corporate Drive, Suite 280, Troy MI 48068. An Equal Opportunity Employer. UNIX is a registered trademark of Bell Labs.



**COMPUTER
HORIZONS
CORP.**

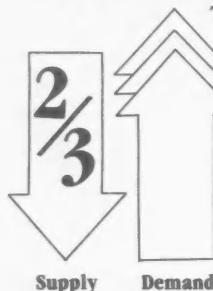
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely is competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who



would consider new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

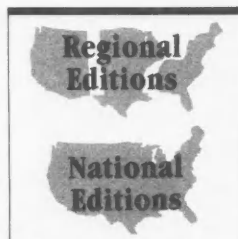
More job seekers see your ad in Computerworld than in any other newspaper — Sunday, daily, or trade

That's because *Computerworld* reaches over 612,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

That's why more companies advertise more jobs in *Computerworld* than in any other professional newspaper. And why *Computerworld* is the *single place* where America's computer professionals *expect* to see the most jobs every week.

Computerworld gives you regional editions

A key option when you need a regional candidate and want to avoid national response and relocation. Yet if your search is national in scope, *Computerworld* can also give you more widespread national exposure than any other source.



Computerworld needs just 3 working days for your ad to appear

That's comparable to most local newspapers. And why your ad can quickly appear in the next issue to start generating quality response.

Computerworld costs no more than local papers

And with a regional line rate of just \$10.80, your cost-per qualified candidate reached is better than *any* newspaper — Sunday, daily or trade. Or just about any other source, for that matter.

Computerworld leads candidates to your ad

Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive or active. It's just one of countless reasons *Computerworld* is America's newspaper of choice on computing. No matter how much the times change.

And while times may change, some things won't. Whether you *use* computers, *make* computers, or *sell* products and services *for* computers, *Computerworld* is still your major source of news today. And your major source of computer professionals tomorrow.



For more recruiting tips, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).



**Weekly. Regional. National.
And it works.**

WANTED: WARRIORS

If you consider a business suit your battle dress and technology as heavy artillery, you may be perfect for Broadway & Seymour Consulting.

We're a small but very aggressive systems consulting and software development firm. In fact, we're so aggressive *Business Week* rated us as one of the fastest growing high-tech companies in America.

So, if you'd like to join an elite team engaged in the art of technological warfare, call Camille Hankins at 1-800-274-9287 or send your resume to: 302 S. Tryon St., Charlotte, North Carolina 28202.

BROADWAY & SEYMOUR CONSULTING

We're looking for warriors.

Positions:

- Managing Consultants
- Software Engineers
- Consultants
- Technical Instructors
- Technical Writers

Expertise:

- Relational Technology & 4GL
- Midrange Systems
- SW Engineering & Case Tools
- Telecommunications & Distributed Environments

Rapidly growing maritime shipping agency, with 32 domestic and 3 foreign offices seeks the following:

BUSINESS SYSTEMS PROGRAMMER/ ANALYST

Minimum 2 years containerized shipping experience. Will work with remote users, and interface with software vendors, and foreign steamship MS staffs on enhancements and modifications to existing systems. Must have knowledge of booking, equipment control, and documentation. AS/400 or S/38 experience highly desirable.

EDI COORDINATOR

Minimum 3 years EDI experience in ocean shipping and transportation. Requires knowledge of TDCC/ANSI X12, international standards and translators. Will implement and support EDI interfaces with principals, terminals, truckers, rail operators, shippers, freight forwarders and regulatory agencies. AS/400 or S/38 experience is a plus.

COMMUNICATIONS SPECIALIST

Minimum 3 years experience in multiple communications environments. Should have knowledge of X.25 networks, multiple site systems, communications with various E-Mail services, third party networks, EDI file transmissions and telex. Experience in video communications and T-1 circuits a plus.

For consideration send resume and salary history to:

Southern Steam, Inc.
P.O. Box 2965
Mobile, AL 36652
Attention: Leah Kadane
Fax (205) 432-1089

OPERATIONS RESEARCH ANALYST required. Design and development of mathematical programming, network optimization algorithms and mathematical models for aircraft operations area. Performs techniques as mathematical programming inventory control, queueing theory, sequencing and scheduling and stochastic modeling. Conceptualize and define problem and formulate mathematical or other model for automated decision support system and implement solution in mainframe and micro-computing environments. Prepare reports for submission to management and recommend the appropriate solution. Applicants required to have a masters degree or its equivalent in operations research and at least one year optimization algorithms and mathematical modeling experience. Applicant must demonstrate one year prior experience in the design, creation and implementation of operational computer simulation models. Annual salary will be \$36,000.00 for a 40-hour work week. Additional salary up to \$42,000.00 per year may be paid if education and experience warrant. Interested applicants apply at the Texas Employment Commission, Austin, TX 77789-0001, J.O. number 5757341. Applicants must have proof of legal authority to work in the United States. Ad paid by an equal employment opportunity employer.

RSVP SERVICES

ANALYSTS • PROGRAMMERS • HW/SW In a Slow Market, You Need A Quick Employment Service

If you have marketable skills, together with reasonable geographic and salary requirements, your resume will be on its way selectively, to our applicable contacts among our 1000+ client companies and 200+ affiliates nationwide. **within 24 hours after we receive it.** No cost or obligation to you; no sales pressure.

Our clients seek 2 years minimum professional experience, stable work history, good technical references, and U.S. citizenship or green card.

TO APPLY: Mail or FAX resume or call Howard Levin.
RSVP SERVICES
Dept. C, Suite 614, One Cherry Hill Mall, Cherry Hill, NJ 08002
800-222-0153 or FAX: 609-667-2606 (refer to Dept. C)

Programmers/ Project Managers

Implement and customize Dun & Bradstreet software packages for Fortune 1000 clients. Excellent salary & benefits including 401(k) plan. Travel required but no relocation involved. Must have IBM utilities, JCL, Cobol and 2 or more years' experience with financial software packages (Dun & Bradstreet preferred). Please send your resume in COMPLETE CONFIDENCE to: **PARKS & ASSOCIATES, 35526 Grand River, Suite 242, Farmington Hills, MI 48335 or call 1-800-899-1448. All fees employer-paid.**

PARKS & ASSOCIATES

Recruitment Services



SAN FRANCISCO BAY AREA

The Bay Area continues to hire... New openings require the following skills:

- DEC/VMS Programmers/Analysts, Systems Programmers
- IDMS/ADSO Programmers, Analysts
- AS-400 Programmers, Analysts
- C/UNIX Programmers, Systems Administrators
- DB2 Programmers/Analysts, Project Leaders
- ROBMS All levels of ORACLE, INGRES, INFORMIX, and SYBASE

THE SEARCH FIRM, INC.

595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 771-3900 FAX 777-8632

MAINE - NH \$25,000 - 50,000 Salary

ROMAC, the largest and oldest placement agency in this area, is seeking qualified data processing professionals with salary requirements in the \$25,000-\$50,000 range. Our clients pay our fees.

ROMAC

Att: Dept. 2
P.O. Box 7040
Portland, ME 04112
(207) 773-4749
FAX (207) 773-2645

SOFTWARE OPPORTUNITIES

713/488-7961

Let our national award winning computer specialists assist you in your search. We have over 300 affiliated offices around the country ready to work for you!

SYSTEMS SOFTWARE
AS/400, S/38 P/A TO \$48K
LIFE INSURANCE TO \$48K
DB ANALYSTS TO \$58K
IMS, IMS OR ADABAS TO \$58K
P/A (COBOL OR ALG) TO \$48K
MVS OR M/MATERIALS TO \$58K
ACF/TAM/NCP TO \$58K
COBOL/CICS TO \$48K
JCLX INTERNALS TO \$58K
UNIX/C TO \$58K
COBOL/DB2 OR IMS TO \$48K
EDP AUDITOR TO \$58K

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. C
Houston, TX 77289-0723
FAX: 713/486-1486

Where systems and network professionals want to be.

If you're looking for challenging systems and network opportunities, look to VISA. VisaNet is the largest and most sophisticated financial transaction processing network in the world. With our 4 major data centers, plans to build 15 globally linked facilities in the future, and the power to process 10,000 transactions every minute, VisaNet offers you the opportunity to put your technical skills to the test in our beautiful San Mateo facilities.

Senior SNA Network Designer/Planner

You'll be responsible for the design, planning, architecture, and implementation of SNA network requirements. This will include designing logical networks to support our existing VisaNet SNA/VTAM-based network and FEP nodes, as well as managing various network-related projects through delivery and implementation. You must have an in-depth knowledge of SNA/VTAM/NCP internals, including recent experience in planning and designing SNA networks in a medium-to-large IBM environment. We also prefer a background in installing 37X5 FEPS, plus a knowledge of netview and automated network operations relating to network management.

Senior SNA Network Capacity Planner

Working with our existing SNA/VTAM-based network, you'll design and implement a methodology for planning network capacity and tuning performance. Analyze data capture from network performance monitoring tools in order to ensure adequate network capacity and to meet service-level performance objectives. We require a solid background in SNA/VTAM/NCP internals, to include recent experience in related design and implementation. You should also have a good understanding of networking topologies. Knowledge of SAS product, Netsys/NPM, SMF/RMF Omegamon, and all related VTAM/NCP trace facilities is preferred.

Network Project Manager

Oversee all Matrix project activities as well as participate in network planning functions during the peak season. In doing so, you'll guide all of our engineering divisions, assist with network software projects, plus interface with a variety of VISA groups to address physical and logical net-

work issues. For this role, you must have 7-10 years' related experience to include a project management background. Excellent communication skills are also essential.

Netview Systems Programmer

You will provide the primary technical support for implementation and maintenance of the communication network management product NETVIEW and VTAM/NCP. Responsibilities include the design, development, and implementation of new CLISTS and command processors used by operations. The successful candidate will have 5-7 years' data processing experience in the area of network management plus a NETVIEW installation and customization background. Familiarity with implementing and maintaining complex network configurations including VTAM/NCP in an SNA environment is essential.

MVS Systems Programmer

You'll support our MVS/ESA operating system and associated product products. This includes the dissemination of technical information to programming staffs and operation centers. To qualify, you must have 5-7 years' technical or system programming experience as well as in-depth knowledge of MVS internals, programming languages and SNA networks. You'll also need a background in SMP/E and OEM product installations. A BS/BA in CS and familiarity with ESA, DB2, CICS and Assembler is highly desirable.

VISA offers an excellent compensation package, including comprehensive benefits. For immediate consideration, please send your resume to: VISA U.S.A., Dept. SW/11/26/CW, P.O. Box 8999, San Francisco, CA 94128. For other VISA opportunities please call our JOB HOTLINE: (415) 378-8299. We are an equal opportunity employer.



We're everywhere you want to be

MIS DIRECTORS

If you need good people, we've got them. Computerworld reaches more than 612,000 computer professionals every week. That's more qualified computer pros than any newspaper can deliver. And you can select either a regional edition or national edition of Computerworld's Computer Careers section for your advertisement.

For more Recruitment information, or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

**Computerworld
Weekly,
Regional,
National.**

And it Works.



Consultants \$30,000 - \$65,000+

Positions exist NATIONWIDE at all levels for degreed individuals who are willing to travel and have at least two years' hands on experience with any of the following products:

- M&D
- Walker
- CA
- MSA
- JD Edwards
- Comshare
- CAD CAM
- Tesseraet
- Integral
- PeopleSoft
- ASK
- MAC PAC
- AS400 (RPG)
- PRJ (Retail)

Join the exciting field of consulting with a prestigious "BIG EIGHT" firm. Top salaries and benefits are available in most major cities. RUSH resume to:

D C T Donald C. Thomas & Associates, Inc.
1410 N. Westshore Blvd. #806
Tampa, Florida 33607
Specialized IRM Personnel Services

COMPUTER CAREERS

DIRECTOR/MIS

**DP strategist...
Entrepreneur...
Systems innovator...**

If you combine all three characteristics, you can look for leadership opportunity and challenge of a rare kind at Unimin, major producer of industrial minerals. Now expanding through acquisition and formation of a Canadian Division, we're committed to systems integration and development of an enlarged MIS network.

To this end, we're looking for an analytical problem solver to define needs and to plan unique, cost effective solutions in systems, hardware/software and communications. The person who can call the technological shots and sell concepts to upper management will run the ultimate show.

Candidates must be degreed and have 7-10 years progressive MIS experience plus pronounced ability to interface and interact with user managers.

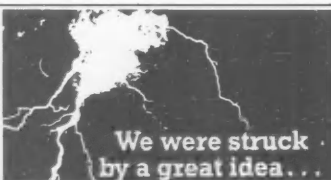
We offer an excellent salary and benefits package. Please send your resume in confidence to:

Unimin

Unimin Corporation
Human Resources Manager
258 Elm Street, New Canaan, CT 06840
An Equal Opportunity Employer

Cabela's PROGRAMMER/ ANALYST IBM AS/400

Leading mail order outdoor outfitter is seeking an additional Programmer/Analyst due to growth. Requires two years programming experience on system 38/AS/400 with PC experience. Must be RPG III fluent. Shop is MULTI-AS/400 site on the leading edge of AS/400 technology. We offer salary commensurate with experience and an excellent benefit package as well as a great place to live, work and raise a family. Send resume with a cover letter to: Cabela's Inc., Attn: Rod Reeder, 812 13th Ave., Sidney, NE 69160.



**We were struck
by a great idea...**

And the results have been electrifying. *Business Week* recently listed CISCORP as the 20th fastest growing high technology company in America during the '80s. Our great idea has been an aggressive approach to developing customized systems focused on SQL development across environments as a complete project solution.

Strategic partnerships with prestigious hardware and software manufacturers have placed CISCORP on the leading edge of technology. Our extremely forward thinking environment specializing in relational database, 4th generation language application development and software engineering requires us to continuously seek top-notch Project Managers and Programmers/Analysts experienced in:

Ingres, Oracle, DB2, OS/2 Presentation Manager, Adabas, Tandem NSSOL, VAX/VMS, Sybase, Progress, Rantis/Supra, or Mainframe/DB2.

We offer limitless opportunity for personal and professional growth, as well as an excellent compensation/benefits program. If you are ready to sell to our previous career environment, please submit your resume in confidence to CISCORP, Penn Center West II, Suite 430, Dept. 0219, Pittsburgh, PA 15278, 800/969-0099 or 412/767-3070 (fax). Attention: Janis Scola.

The vision of tomorrow's technology — TODAY
Atlanta • Baltimore • Cleveland • Dayton • Philadelphia • Pittsburgh • Silicon Valley
An Equal Opportunity Employer

CISCORP

FLORIDA

We are Romac & Associates, specialists in the data processing industry. Currently our technically sophisticated clients have requirements for:

- PROGRAMMER ANALYSTS
- SYSTEMS PROGRAMMERS
- MIS PROFESSIONALS

WHO HAVE EXPERIENCE IN ANY OF THE FOLLOWING AREAS:

- DB2/IMS
- COBOL
- FORTRAN
- KOLBEX
- TAND/AD/AL
- IMS
- INGRES
- DB2
- HP/VAX
- CASE TOOLS
- C

Our clients offer top salaries and a perfect climate. Please send your resume or call any of our consultants.

1 Harbour Place #888C
Tampa, FL 33602
(813) 220-5575

ROMAC

Professional Recruiters
All fees are assumed by our client companies.

Programmer Analyst, 40 hrs/wk, 9:00am - 5:00pm, \$33,000/yr. Design, development, implementation and testing of applications software for mobile communications system. Projects for subsystems include: Telephone Number Inquiry; Switch Administration; Switch Administration Standalone. Networking. Tools: Mainframe, mini and microcomputers. VAX/VMS, VAX SQL, VAX CDD, Switch Manager, C, Cobol, Master of Science degree in Computer Science as well as one year experience as a Programmer Analyst or as a Software Engineer required. Previous experience must include: C and COBOL. Graduate course work must include: Data Communication; Database Theory and Application; Data Structure and Algorithm. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 3 401 South State Street, 3 South, Chicago, Illinois 60605, Attention: Mary Miles, Reference #V-L-1745-M. NO CALLS, AN EMPLOYER PAID AD.

UNISYS

PROGRAMMERS
COBOL DMS II to \$40K
DMS1100 to \$46K
MAPPER to \$45K
LINC to \$50K
DB2/AS to \$55K
EXEC or MCP to \$60K
TRAVELING P/A's to \$45K
Permanent placement for UNISYS Programmers and Analysts throughout the US. FREE service to candidates

COMPUTER STAFFING
call 800/88UNISYS

Real Time Programmer/Analyst for Northeast Ohio Computer Services Company. Duties include System analysis and development of real time software system with emphasis on resource allocation and scheduling with respect to distributed processing in a multi-processor fault tolerant on line transaction processing environment using Tandem computer. Improve the processing of time critical transactions and the efficiency and reliability of the system including re-programming real time programs. Requires a Master's Degree in Computer Science and two years' experience as a Systems Analyst. Two years related job experience must include two years on-the-job experience in communication network using X.25 protocol and large scale mainframe e.g. VAX 785 or CDC/CYBER 170/720 computer. Degree must include graduate coursework in Communication Networks, Data Base Management Systems, Computer System Architecture and Data Structure. 40 hrs/wk, 8am-5pm, Mon-Fri; \$34,580.00 per year salary. Must have proof of legal authority to work permanently in the U.S. Send resume in duplicate to: J. Davies, JOE 1255627, Ohio Bureau of Employment Services, P.O. Box 1616, Columbus, Ohio 43216.

Sai Software

Sal, one of the fastest growing contract programming and consulting firms, with offices in Houston, Dallas, and Washington D.C. has immediate openings for talented programmer/analysts. We are looking for:

- UNIX, C, ADA, DB/CL
- REAL TIME APPLICATION
- VAX FOCUS (WASH D.C.)
- UNIX, C, DEC WINDOWS
- SYS 38/38 COMMUN (NY)
- APS DEV. CENTER
- SQL, DBA

Please call, fax or mail resume to:

Sai Software
Consultants, Inc.
2330 Timber Shale Ste 2021
Kingwood, Texas 77339
1-800-896-2748
(713) 358-1858
Fax (713) 358-8953

PRODUCT DEVELOPMENT ANALYST II

Consult with customers and members of support and development regarding NetSpy problems, network performance issues, VTAM and NCP files and/or tuning, reviewing and authorizing fixes. Solve problems that are referred by the NetSpy support team.

Bachelor's degree in Computer Science or Electronics Engineering or equivalent. Graduate degree preferred. Outstanding problem solving skills (debugging), B.A.L. proficiency and experience in systems programming and communication software. Good supervisory and project management skills. 40 hrs./wk., Mon. to Fri., 8AM - 5PM, \$52,250 - \$55,000/yr.

Send resume to: CW-64227, Computerworld, Box 9171, Framingham, MA 01701-9171.

CA & AZ CONTRACTS

CONSULTANTS WANTED

PAI
P. Murphy & Associates, Inc.

4405 RIVERSIDE DRIVE, SUITE 100
BURBANK, CA 91505
(818) 841-2002 (714) 552-0506
FAX: (818) 841-2122

CONTRACTORS ALL TECHNICAL SKILLS

**NATIONWIDE
REQUIREMENTS**
Maximize your exposure and your billing rate. We mail your resume to brokers nationwide at no cost to you.

Send your resume to:
JKL Enterprises, Inc.
500 North College
Suite 108
Charlotte, NC 28202
FAX: (704) 333-0233
Or Call: (704) 342-9519

Hardcore Software People

We need analysts/programmers for IBM or DEC environments. According to *Info Magazine* WTW is #150 of America's fastest growing companies. Join our team and earn what you're worth. WTW is a national software consulting firm offering excellent salary and benefits and the opportunity to position yourself for success.

Call immediately or send resume:

1-800-633-3885
Attn: Nancy Lawless
Wesson, Taylor, Wells
P.O. Box 3048
Valley Forge, PA
19484-3048

Wesson, Taylor, Wells is an equal opportunity employer

AC/PTF SOFTWARE ENGINEER required. Design and analysis of systems software and software internals in an AC/PTF real-time environment. Initiates recommendations and conducts feasibility studies on new products and systems evaluated for installation. Work on Airport Processing System area using Assembler Coding, AC/PTF internals and TPF reinvent code. Provide technical expertise in the area of AC/PTF operating system software. Applicants required to have a bachelors degree or its equivalent in computers, math, or engineering with at least two years AC/PTF Systems Internal and Assembler Coding experience. Annual salary will be \$35,000.00 per year for a 40 hour work week. Additional salary up to \$42,000.00 per year may be paid if education and experience warrant. Interested applicants apply at the Texas Employment Commission, Fort Worth, Texas, 76778-0001, J.C. number 657338. This advertisement was paid by an Equal Opportunity Employer.

Systems Analyst, 40 hrs/wk, 8:00am-5:00pm, \$30,875/yr. Design, development, implementation and testing of inhouse proprietary software models to analyze financial markets. Projects include: generation of code to verify performance of algorithms applied to the distribution of trading data; development of proprietary volatility curves for index stocks; design of color graphics; statistical and numerical analysis; database management and maintenance. Tools: SPUS, CLINIX, Sun Workstation, Informatica Master Science degree in Computer Science as well as 3 months experience as a Systems Analyst or as a Programmer Analyst required. Previous experience must include management of interactive database. Education or experience must include one project in interactive computer graphics using C language and SUN workstation. Must have proof of legal authority to work in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, IL 60605, Attention: L. DeBorja, Reference #V-L-1927-D. NO CALLS, AN EMPLOYER PAID AD.

PROGRAMMERS/ ANALYST

Consulting Opportunities
in South Florida

We need your expertise. If you have two years or more experience in any of the following skills:

- IBM SYS 38/AS400
- J.D. EDWARDS
- DB2
- IMS
- ORACLE
- C
- IMAGING

Please call ZBTECH, INC. (305) 936-4461 or fax your resume to: (305) 936-8572.

DATA BASE ADMINISTRATOR

Prestigious NC firm has an opening for a Data Base Administrator with experience in DB2, CASE TOOLS, and installation of DB2 applications. Outstanding ground floor opportunity. Salary to low \$60's.

Contact JIM BOSTIC, PHILIPS RESOURCE GROUP, P.O. Box 5664, Greenville, SC 29606 or call 803/271-6350 (D), 803/292-1181 (E), or 803/271-8499 (FAX).

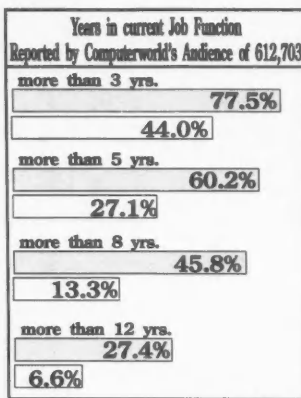
TPF PROGRAMMER II: programming & systems analysis in TPF operating system. Design, test and maintain software packages using BAL and Sabretalk languages. Prepares reports of all modifications. 8-4, M-F, \$630. per week. Must have B.S. degree in Computer Science & 2 months TPF training. Resume only to JOB SERVICE OF FLORIDA, 701 S.W. 27th Avenue, Room 15, Miami, Florida 33135 Ref: Job Order #FL0365871

When you compare costs and the people reached, Computerworld is the best newspaper for recruiting qualified computer professionals. Place your ads today!
**Call toll-free
800-343-6474
Or in Mass
(508) 879-0700**

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you only qualified computer professionals.

Unlike the readers of Sunday or daily newspapers, every Computerworld reader is an experienced computer professional. In fact, the majority of Computerworld's audience has experience beyond three years. What's more, some subscribers have been reading Computerworld ever since its first issue in 1967. Simply put, Computerworld delivers far more than just job candidates - it delivers qualified job candidates.



☐ Entire Career
☐ Present Job

SOURCE: Skill Survey of Computerworld's Audience, May 1989.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).



"...We turned leads into sales in just 60 days. So our Computerworld Response Card advertising quickly paid for itself."

— Russ Teubner
President
Teubner & Associates, Inc.

Teubner & Associates, Inc., a developer of communications software based in Stillwater, Oklahoma, has just introduced FaxGate into the IBM arena. FaxGate, the facsimile gateway for IBM mainframes, allows direct printing of high-quality output on virtually every fax machine worldwide. Now it's up to President Russ Teubner to utilize the most cost-efficient means for telling IBM mainframe users about this one-of-a-kind communications product.

"Specifically, our target market is Fortune 500 and 1000 companies. On a much wider scale, however, all owners of IBM mainframes are potential buyers. We know that Computerworld provides the best penetration into this broad-based audience and gets our message into the hands of all the people making the buying decisions. That's why we're running a consistent advertising program in Computerworld Response Card Decks."

"True, I was a bit skeptical of the potential value of response card advertising. What I've found out, though, is that a bunch of people do look at card decks. Now I'm a true believer. Experience shows that Computerworld Response Cards cost effectively deliver our message to the qualified prospects we need to reach."

"Our marketing goal is to generate quality leads — and to turn as many as possible into sales. By focusing on MIS decision makers, Computerworld Response Cards are playing a key role in helping us achieve this goal. Results tell me that Computerworld Response Cards will remain a standard part of our advertising mix."

Computerworld Direct Response Cards give you a cost-effective way to reach Computerworld's powerful buying audience of over 134,000 computer professionals. They're working for Teubner & Associates — and they can work for you. Call Norma Tamburrino, National Account Manager, Computerworld Direct Response Cards, at (201) 587-0090, or (201) 587-0297 to reserve your space today.



**COMPUTERWORLD
DIRECT RESPONSE CARDS**

MARKETPLACE

More firms taking road to PC rentals to meet demands

BY DAVID CLAIBORNE
SPECIAL TO CW

EAI Corp., a defense contractor in Abingdon, Md., had two weeks to obtain 10 personal computers and associated peripherals to fulfill a contract to support the U.S. government in a high-level on-site product development project. The assignment was to be completed in 90 days. Where would the company find the systems the government needed? Should they be rented, leased or purchased, and who offered the best deal?

The defense contractor opted to rent because of the short turnaround period and the immediate need for the systems. It did not make sense to buy the equipment because the company would have no use for it after the project.

Furthermore, rental was the most cost-effective solution. The firm only "incurred the cost of the units for 90 days, and we were able to charge the entire cost back to the client," says Monica Borland, EAI vice president.

Safe from breakdowns

The rental route also added some security: If a computer broke down at any time during the project, another could be sent to the company within 24 hours as part of the rental agreement, Borland says.

Despite the advantages of renting PCs,

many companies often view purchasing as the only option. Short-term rentals are ideal for meeting the demands of crash projects or for temporary replacement of failed equipment.

Rentals also offer companies the opportunity to evaluate products under real-life circumstances before they lay out a large purchase price.

A company's fear of being stuck with obsolete technology can also weigh heavily in deciding whether to rent or buy. Technology changes so rapidly that there are no guarantees that the PCs purchased today will be up-to-date in two years.

Lastly, if a company chooses to rent, it is spared many of the maintenance and depreciation hassles. Most rental contracts specify that the rental agents will incur responsibility for all maintenance for the length of the contract.

The dark side of these contracts is that it will end up costing a company more to rent systems to meet long-term needs.

Rental contracts, of course, vary. A random survey of rental companies on their monthly rates for an IBM Personal System/2, Model 50 uncovered a range from \$248 to \$275. For Apple Computer, Inc.'s low-end Macintosh SE30, the rates ranged from \$340 to \$380. All the month-

ly rates include maintenance fees. Some rental companies even offered 24-hour replacement service, depending on the rental firm's location in relation to the renter. Delivery and installation fees were not included in the monthly rate.

According to a combination of industry resources, the annual PC rental market currently stands between \$300 million and \$400 million, with growth rates predicted to be between 20% and 30% over the next three years.

Despite this volume, the market has been historically populated by small, independent companies serving local geographic regions.

Partly because of the lack of big-name, nationally advertised rental firms, many potential renters have not been aware of the number of companies that can supply computers and peripherals on a daily, weekly or monthly basis.

However, Dan Ness, an analyst at La Jolla, Calif.-based research firm Computer Intelligence, says people are starting to become more aware of rental companies. "While CI isn't tracking rentals right now, our clients who sell to these corporations are starting to show more interest in the rental market," he says.

Indeed, during the past 18 months, several well-known vendors have entered the market. For example, IBM, recognizing the potential sales volume represented by rental companies, has authorized three pilot rental centers; Digital Equipment Corp. is planning a similar program

for its systems.

Large retail outlets such as Computerland Corp. and Businessland, Inc. have started rental divisions. Since January 1989, five "Businessland Rents" depots have opened, and there are plans for 15 more over the next three years.

Furthermore, several of the smaller rental companies are starting to expand to multiple-city outlets, primarily through the franchising route. The entrance of these franchises is similar to the presence of The Hertz Corp. and Avis, Inc. in the car rental business: They add credibility.

Where to choose?

Now, renters are faced with more choices: independent rental firms, franchises and big names such as IBM.

One advantage of independent rental houses is that they offer a variety of machines, including low-priced clones, to suit customer needs.

On the other hand, big-name vendors would only rent their own brand, which may or may not fit the bill. There may also be fewer pricing options. However, the major brands are well established and very secure compared with the other outlets.

The benefits of franchises are that they generally offer customers the security of a well-established firm, a larger support staff and larger inventories. Smaller rental places may have dubious track records.

The bottom line? The rental market is growing not only in size, dollars and recognition but also in the options that users can choose from.

Claiborne is a consultant in Highland, Md.



Buy/Sell/Lease

Great Deals on WANG PCs

- Custom configurations for LAN networking
- Most models in stock for immediate delivery
- Wang 300 and 400 series, workstations, printers, peripherals, Wang-compatibles
- Other PCs: IBM, Epson, HP, NEC, Arche, AST, Zenith, Toshiba, others...

SAVE 50% on WPB-Refurbished WANG
VS, OIS, Printers, and Peripherals
Guaranteed acceptable for the
WANG Service Contract

1-800-223-9264

Wang
AUTHORIZED WANG PC DEALER
Member WIDA

*New Wang PCs sold in Wang's Eastern Zone and Southern California only

HP HP HP HP

NEW and USED
1000 • 3000 • 9000
Including Spectrum

BUY • SELL • TRADE • RENT • LEASE
Processors • Peripherals • Systems

All in Stock - Immediate Delivery
All warranted to qualify for manufacturer's maintenance

ConAm Corporation
It's Performance That Counts!
800/643-4954 213/829-2277
FAX 213/829-9807

IBM SPECIALISTS

SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
3741 3742

- * New and Used
- * IBM Maintenance Guaranteed
- * All Peripherals
- * Immediate Delivery
- * Upgrades and Features
- * Completely Refurbished

800-251-2670

IN TENNESSEE (615) 847-4031



PO BOX 17 • 610 BRYAN ST. • OLD HICKORY, TN 37138

Buying Selling

DEC-SUN
Data General
Plus
All Peripherals

Call DCC

617-837-7255

or

301-750-7200

MAI BasicFour

MPx 9410

Sale or Lease

Call 617-267-8600

BoCoEx Index Annual Three-Year Comparison

Closing prices report for the week ending November 16, 1990

	Nov 1990	1989	1988
IBM PC Model 176	\$375	\$500	\$600
XT Model 086	\$500	\$765	\$1,150
XT Model 089	\$550	\$1,025	\$1,300
AT Model 099	\$650	\$1,600	\$2,050
AT Model 239	\$875	\$1,725	\$2,375
AT Model 339	\$900	\$1,825	\$2,450
PS/2 Model 30-286	\$1,250	N/A	N/A
PS/2 Model 60	\$1,500	\$2,700	N/A
PS/2 Model 70P	\$3,425	N/A	N/A
Compaq Portable II	\$900	\$1,625	\$1,700
Portable 286	\$1,275	\$1,600	N/A
SLT 286	\$2,500	\$2,600	N/A
Portable 386	\$2,600	\$4,100	N/A
LTE 286	\$2,000	N/A	N/A
Deskpro 286	\$1,175	\$1,775	\$1,900
Deskpro 386/20	\$2,900	N/A	N/A
Apple Macintosh Plus	\$750	\$1,350	\$1,425
SE	\$1,150	\$2,200	\$2,550
II	\$3,100	\$3,500	\$3,600
IIFX	\$6,600	N/A	N/A

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Buy/Sell/Lease

IBM
SERIES 1
SYSTEM 36/38
SYSTEM AS/400
4300

• SPECIAL LEASE RATES ON AS/400's
• Buy • Sell • New • Used

• Trade • Lease

MEMBER OF **WAL**

NEWPORT LEASING, INC.
(800) 6789-IBM
2013 Palmar St. Santa Ana, CA 92705-1415
714 476-4276 FAX 714 476-9200

• Equipment Configured To Your Requirements
• All CPU Usage Rates
• IBM Mainframe/IBM Peripheral Guaranteed
• Disk • Tape
• Flexible Lease Options Tailored To Your Needs
• Printers • Terminals

RENT RIGHT FROM THE SOURCE.

High-quality datacomm products from Codex

In-stock products shipped within 24 hours!

Modems — V.32, dial, leased line

Multiplexers

DSUs/CSUs

And much more

Why hesitate?
Call us for a quote

800-446-6336.

Fax: 508-261-7105

- Rent direct from Codex and you'll have valuable equity later if you choose to purchase
- All of the versatility, quality and reliability you've come to expect from today's leading datacomm supplier
- Full Codex warranty and nationwide service - installation also available
- Flexible payment options - check, charge, P.O., or C. O. D.

CODEx EXPRESS

BUY • SELL • LEASE

AS/400
S/38, 36, 34
SERIES 1

- SYSTEMS
- PERIPHERALS
- UPGRADES

SOURCE DATA PRODUCTS
19762 MacArthur Blvd.
#120, Irvine, CA 92715

(714) 851-1970
(800) 333-2669

ICE
INTERNATIONAL COMPUTER EXCHANGE, LTD.

1-800-ICE-BUYS

digital
Data General
sun
apollo
IBM
PC/AT/PS2

BUY • SELL • LEASE • NEW • USED PERIPHERALS • SYSTEMS • UPGRADES

VAX Station 3100 NEW.....\$14,000	IBM NEW 6450804 2MB Mem.....\$350
VT 420...NEW..\$495	IBM NEW 6450876 80486 Upgrade.....\$1,995
VT 320...NEW..\$429	IBM NEW 34F2933 4MB Mem.....\$850
VT 220...USED..\$225	
Apollo...CN2500 NEW Loaded \$7,500	IBM NEW 34F2933 4MB Mem.....\$850
HP...4MB Mem. P/N 96267-A.....\$900	INTELL...82380-20 INTELL...80486-25

CALL TODAY FOR QUOTE
1-800-ICE-BUYS

INTERNATIONAL COMPUTER EXCHANGE, LTD.
TEL.: (617) 885-8888 • FAX: (617) 885-8177
• 103 MAIN ST., KINGSTON, MA 02384 •

Buy **Sell**

Lease **Rent**

Currently replacing Series/1's with the new AS/400 line via EDX to ADX migration

612-942-9830

DATA TREND
1020 Valley View Road
Suite 119
Eden Prairie, Minnesota 55311

SPECTRA
EQUIPMENT CORPORATION

(714) 970-7000 (800) 745-1233 (714) 970-7095 FAX

BUY SELL RENT LEASE

IBM **digital** **XEROX**

ANAHEIM CORPORATE CENTER 5101 E. La Palma Ave. Suite 206 Anaheim California 92807 LOS ANGELES SAN JOSE SEATTLE	9370, 4381 AS400, S/36, S/38 Point of Sale CAD/CAM Series/1 Banking	MicroVax VAX 6000 VAX 8000 PROCESSORS PERIPHERALS UPGRADES	2700 3700 4050 4090 8790 9790
---	--	---	--

Integrity... the Spectra difference!
A full line IBM and Digital computer dealer

From 20's to 90's
Most Machines,
Peripherals &
Features
IN STOCK

Call us for a quote
708-831-1255

Executive Information
1530 Eastwood Ave., #100
Highland Park, IL 60035

CDR

IBM

BUY SELL LEASE

PS/2 OPERATING LEASES

3084 3090 PERIPHERALS

OEM/PCM LEASES

800-888-7568
FAX 214/783-1378

MEMBER **CDR** EST. 1978

HONEYWELL
LEVEL 6 DPS 6
SERIES 16

- Complete Minicomputer Line - New & Used
- All Peripherals & Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery
- Low Prices
- HDS 5 and HDS 7 Compatible Terminals

The Recognized Leader in Honeywell Minicomputer Sales and Support

Boudreau Computer Services
100 Bearfoot Road
Northboro, MA 01532
(508) 393-8839
FAX 508-393-3781

"Since 1974"

CALL US LAST

GET YOUR BEST PRICE THEN CALL

COMPUTER BROKERS, INC.

WE

Buy - Sell - Lease

New and Used IBM Equipment

AS/400 - System 36, 38, 43XX

SHORT TERM RENTALS

Call 800-238-6405
IN TN 901-372-2622

COMPUTER BROKERS, INC.
2978 Shelby St., Memphis, TN 38134

"Since 1974"

WE BOUGHT IBM

By the thousands.

As a result of our thousands of purchases of new and used IBM systems of all sizes, shapes and descriptions, we are offering you **great savings** on IBM AS/400's, 36's, tapes, drives, printers and peripherals, as well as all upgrades.

As a specialty, we offer multiplexors, modems, protocol converters and PS/2's.

If you have a need to buy or sell, call us first and **DEAL DIRECT** with the...

COMPUTER MARKETPLACE

800-858-1144

In CA, dial (714) 735-2102, 265 East 5th Street, Corona, CA 91719

IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES, INC.

PCM
PEARSON COMPUTER MARKETING, INC.

Buying used IBM equipment:

- 3380 - Disk
- 3480 - Tape
- 3880-X23 - Cache Controllers (any model)
- 3990 - Controllers

*** Eligible for IBM M/A

Call Chris Bruton
(216) 892-3990

END-USERS ONLY

PRIME

EXPERIENCED SYSTEMS AND PERIPHERALS

BUY-SELL-LEASE BROKERAGE

NEW PLUG-COMPATIBLE DISK, TAPE, MEMORY

PLUS THE FASTEST I/O AVAILABLE ANYWHERE

1ST SOLUTIONS, INC.
11440 N CAVE CREEK RD
PHOENIX, AZ 85020

ASK FOR DON SHAFRIS
602-997-0997
Fax: 602-997-1688

CDR

New/Reconditioned Equipment

Whatever your requirements are for Digital Equipment, call CSI first! Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is eligible for DEC maintenance.

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

CSI Computers Systems, Inc.
83 Easton St.
Easton, MA 02234
Call Toll-Free 1-800-426-5499
In Mass. (508) 230-3700
FAX (508) 238-8250

CALL 1-800-345-9370

9370

IN-HOUSE TECHNICIANS

Buy Sell Lease

Ssi
simon systems inc.

Associates inc.

- Data General
- Fujitsu
- Data Products
- CDC
- Printronix
- Zetaco

BUY SELL TRADE

617/982-3664
FAX: 617/871-4456

For Sale

Six used Davox 850 Auto Dial systems. Includes all the necessary peripherals to commence calling.

Systems are ideal for:

- High volume Calling
- Telemarketing Programs
- Solicitation Programs
- Collection of Receivables
- Customer Surveys

Also available are 4 complete tape to disc conversion systems. Call today for information.
(516) 673-2439

CRS, P.O. Box 5217
Melville, NY 11747

CLASSIFIED MARKETPLACE

Where Computer Professionals Shop

(800) 343-8474
(In MA: 508/879-0700)

CLASSIFIED

Buy/Sell/Lease

IBM

BUY (800) 888-2000

LEASE

SELL

9370
4381

SYSTEM
36/38

**SERIES
1**

AS/400

**POINT
OF
SALE**

Processors

Peripherals

Upgrades

Dempsey

BUSINESS SYSTEMS

8807 Beach Blvd., Suite 323
Huntington Beach, CA 92648 (714) 847-8866

IBM

BUY • SELL • LEASE

AS/400

S-3X

S-23

**SERIES ONE
BANKING
EQUIPMENT**

AMCOM

800-328-7723
612-949-9400

FAX:

612-949-0750

Software

KeyEntry III

PC-BASED DATA INPUT SOFTWARE

REPLACE DEDICATED DATA ENTRY SYSTEMS

FRONT-END MAINFRAME APPLICATIONS

- LAN or stand-alone environments
- Two-pass verification
- Batch balancing and check digits
- Operator statistics reporting
- Embedded-numeric keypad emulation
- Extensive field edits and table lookups
- Screen Painter and MenuManager included
- Batch Control System and Reformat utility
- User-definable help screens and windows
- OS/2 version
- Outstanding customer support
- Thousands of users worldwide
- French, Spanish, and German versions
- Consulting, conversion and integration services

FREE evaluation systems available for qualified companies.

1-800-533-6879

SOUTHERN COMPUTER SYSTEMS, INC.
2732 Seventh Avenue South • Birmingham, AL 35223
PHONE (205) 321-2985 • FAX (205) 322-4851

Send/Receive
Faxes Directly
From Your:

IBM

RS6000®

To Receive a
Free
Brochure Call:

708-574-3600
Fax: 708-572-0508

DEVCOM MID-AMERICA, INC.

COMPUTER ROOM EQUIPMENT

LIEBERT

Computer Room Air Conditioners

3 thru 22 Ton Units

Main Frame Chillers

3 thru 12 Ton Units

Power Distribution Units

30 thru 225 KVA

PILLER

40 & 75 KVA Silentblocks

LIEBERT, EXIDE, EMERSON

EPE & IPM

1.75 - 500 KVA UPS Systems

RAISED ACCESS FLOORING

Thousands of square feet in stock,
wood and metal.

All items listed are reconditioned with warranty

dp
support

DP SUPPORT
P.O. Box 1409
Pleasant, TX 75086
214-432-4851
214/578-1238 Fax



FOR SALE

**FPS Computing
System
Model 64/164**

Will configure with Disk,
Memory & Max. Boards
to meet your needs.

Other FPS Computing
Systems available

International
Computing Systems

800-522-4272

Fax: 612-935-2580

Prime

Experienced
Systems
New & Used
Peripherals
Worldwide Service

Buy - Sell - Lease

OTW, Inc

305 Union St

Franklin MA 02038

508-520-0250

Time/Services

Quality Outsourcing

- IBM Mainframe/Peripherals
- Full Technical Support
- 24 hour Help Desk w/ 800#
- Database Specialists
- Consulting Services
- Network Specialists
- Capacity Planning
- Automated Operations

Resources Available Include:

MVS/XA, VM/XA, CMS, CICS, DB2/QMF, TSO/E,
ISPF/PDF, SAS, Librarian, IBM IN, PANVALET,
EASYTREVE, Telnet/Tymnet, TOP SECRET



Call: (201) 216-3216

INFORMATION TECHNOLOGY ALLIANCE CORPORATION

Peripherals/Supplies

9-Track Tape
For Your
IBM
PC/XT/AT/PS-2™



Read 1600 or 6250 bpi
9-track tapes from a micro,
mini or mainframe in EBCDIC
or ASCII as mirror image or
by individual files.
Use the 2000 PC for
disk backup, data inter-
change or archival storage.
PC/XT/AT/PS-2 are trademarks of IBM.

DIGI-DATA CORPORATION
10000 Dorsey Road
Jewett, MD 20794-9990
(800) 780-8395
FAX (301) 498-0771

Go Shopping in...
Computerworld's
**CLASSIFIED
MARKETPLACE**
Call for all the details
(800) 343-6474
(in MA, (508) 879-0700)

MASS STORAGE?

VHS-Based system holds 10.4
gigabytes/assette
transfers
data up to 7.2 gb/hr., file
searches in under 90 seconds,
integrates with robotics holding
up to 600 cassettes (6.24
"near line" TERABYTES) inter-
faces to ALL computers & net-
works, under 2 minutes access
to any file in 6 to 9 terabytes!

CR
ASSOCIATES, INC.

TEL: 508-372-8538
FAX: 508-521-1418

COMPUTERWORLD

**Classified
Marketplace**

gives you buyers
with extensive
purchase influence.

In fact, a full 96% are in-
volved in purchase decision
making for their organiza-
tions. They determine
needs, evaluate technologies,
identify solutions, and select
products and vendors for the
entire range of information
systems, as well as related
products and services.

So if you're selling computer
products and services, ad-
vertise in the newspaper
that delivers buyers with
volume purchasing influ-
ence. Advertise in Comput-
erworld's Classified Market-
place!

For more
information, call

(800) 343-6474
(in MA, (508) 879-0700)

Computerworld's Classified Marketplace

needs only
3 days notice
to run your
ad! Call:

(800) 343-6474

(in MA: 508/879-0700)



Bids/Proposals/Real Estate

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE is hereby given that the Metropolitan Transportation Authority (MTA) will receive proposals for the following article as indicated below, on which date they will be opened and reviewed at the indicated time at the Authority's offices at 347 Madison Avenue, New York, NY 10017 (6th floor). Copies of such forms and specifications may be secured from Ms. Angie Priet, Executive Secretary, Department of Procurement Services, Metropolitan Transportation Authority, 347 Madison Avenue, New York, NY 10017.

- The degree to which the product meets the requirement of the technical specification (Item 8).
 - The degree to which the proposal meets TA's training support, maintenance and documentation requirement.
 - The vendors overall responsiveness to the RFP package. This criterion will include but is not limited to providing the information requested, providing the information in the format requested, acceptance of MTA Terms and Conditions and pricing submitted as requested.
 - Total cost of the system.
- RFP# DATE TIME
6-01-90357-0 12/26/90 3PM
FOR: "Off-the-Shelf" License of a Software Product that Interfaces between QMS/RACE"

It's the
**Classified
Marketplace**
Reach Computer
Professionals
Where They
Shop For:

- Buy/Sell/Lease
- Hardware
- Software
- Peripherals/Supplies
- Communications
- Graphics/Desktop Publishing
- Time/Services
- Bids/Proposals/Real Estate
- Business Opportunity

CALL NOW

800 343-6474
(in MA, (508) 879-0700)

SUNGARD

COMPUTER SERVICES

OUTSOURCING EXPERTISE

FIXED PRICE COMPUTING

ECONOMICAL PRICES - SIGNIFICANTLY LESS THAN
IN-HOUSE

IBM 3090 COMPUTERS WITH MVS/ESA, AND VM
TECHNOLOGY

EXTENSIVE NATIONWIDE TELCOM NETWORK

EXTENSIVE LIBRARY OF THIRD PARTY SOFTWARE

PROFESSIONAL SERVICES FOR APPLICATION
SUPPORT & DEVELOPMENT

FOR MORE INFORMATION CALL:
(800) 441-4233 (215) 387-3890
(212) 945-8540

SUNGARD COMPUTER SERVICES INC.
1285 DRUMMERS LANE
WAYNE, PA 19086

Your used
computer
equipment
deserves a
second chance.

If you have used computer equipment to sell, Computerworld's Classified Marketplace is the best place to do your selling. That's because the Classified Marketplace features a Buy/Sell/Lease section to help you market your equipment to the very people who are looking to buy.

And when you advertise in Computerworld Classified Marketplace, you reach a total (ABC-audited) audience of over 612,000 computer professionals who turn to Computerworld for news, information, features - and the Classified Marketplace - every week.

So give your used computer equipment a second chance today. To reserve your space, call:

800/
343-6474
(in MA, (508) 879-0700)

ICOTECH



MVS/XA TSO/ISPF/SDSF VTAM FILE-AID DB2 SIMWARE
CICS INTERTEST ACF2 ACF2
ADABAS SAS \$AVRS
LIBRARIAN

- 24 hour availability
- International access
- Superior technical support staff
- Uninterrupted Power Supply
- Certified on-site vault
- Disaster recovery
- Impeccable service

Call Now - Solve Your Computing Worries

TODAY & TOMORROW!
(201) 685-3400

Time/Services

QUALITY COMPUTING SERVICES

PROCESSING & SYSTEMS OPERATIONS

OUTSOURCING
FACILITIES MANAGEMENT
REMOTE COMPUTING / TIMESHARE

SYSTEMS PLANNING & CONSULTING

STRATEGIC SYSTEMS PLANNING
NEEDS ANALYSIS / FEASIBILITY
QUALITY ASSURANCE PROGRAMS

PROJECT MANAGEMENT

PROJECT LEAD / CONSULTANT SUPPORT
SYSTEMS DEVELOPMENT
SYSTEM / DATA CONVERSIONS

For more information contact Susan Boush at:
(206) 924-2527 or (800) 654-9347

Weyerhaeuser
Information Systems



REMOTE COMPUTING OUTSOURCING

• MVS/XA • VM/370 • DOS/VSE
• CICS • TSO • CMS
• DB2 • IMS/DBDC

OVER 150 SOFTWARE PRODUCTS

• DEVELOPMENT • DEBUGGING
• PRODUCTIVITY • PERFORMANCE

• TELESNET • TYMNET
• SEARNET • IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE
MIGRATION MANAGEMENT

GIS
INFORMATION
SYSTEMS, INC.

815 Commerce Drive, Oak Brook, IL 60521

708-574-3636

New England
617-595-8000

OUTSOURCING AND REMOTE COMPUTING

- IBM MVS/XA Environment
- DB2, IMS/R, Model 204 and 4GLs
- Professional Support Staff
- Experienced Migration Management Team
- Simplified Pricing and Invoicing
- AS/400 Full Supporting Services
- Media Conversion
- Laser & Impact Print Facility
- Application Programming
- Technical Support
- 24 Hours a Day - 7 Days a Week

May & Speh, inc.

1501 Opus Place, Downers Grove, IL 60515-5713

(800) 729-1501

For More Information Contact: Tony Ranieri

OUTSOURCING SERVICES

IBM MVS/XA • VM/CMS

TSO • SUPERWYLBUR • CICS • CMS
Extensive Library of 3rd Party Software

"We offer fixed price solutions"

- Professional Services
- Laser Printing
- Capacity Planning
- Nationwide Network
- 24 Hr/Day, 7 Days/Week
- Over 25 Years Experience

COMPUTER NETWORK SYSTEMS, INC.
(202) 537-2500

5185 MacArthur Blvd., N.W. • Washington, D.C. 20016

It's the

CLASSIFIED MARKETPLACE

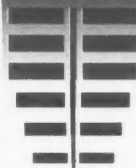
Reach Computer Professionals
Where They Shop For:

- ☐ Buy/Sell/Lease
- ☐ Software
- ☐ Communications
- ☐ Time/Services
- ☐ Conversions
- ☐ Hardware
- ☐ Peripherals/Supplies
- ☐ Graphics/Desktop Publishing
- ☐ Bids/Proposals/Real Estate
- ☐ Business Opportunities

CALL NOW!

(800) 343-6474

(In MA., 508/879-0700).



MCN Computer Services

is your link to perfection.

State-of-the-art IBM compatibility:

MVS-ESA • VM/XA • TSO/E •
ROSCOE • CICS • IMS • IDMS/R •
DB2 • QMF • PROFS •

Programmer productivity aids:

FILE-AID • CICS PLAYBACK •
dBUG-AID • ABEND-AID • CICS
ABEND-AID •

(Preceding products are registered
trademarks of Compuware Corporation)

MCN Computer Services provides outsourcing solutions to major international clients. With one of the country's finest computer facilities, your data is secure, yet readily available. High-quality, cost-effective services include:

- Remote computing
- Computer outsourcing
- Facility management



MCN
Computer
Services, Inc.

For more information, call Lisa Walker at:

1-800-521-0444

5225 Auto Club Drive
Dearborn, Michigan 48126

Financial Technologies

Innovative, Responsive,
Quality

a few words that describe
the most complete
computer processor

offering....

IBM 3090, MVS/XA,
MSA, DB2, VM/HPO,
TSO, CICS/VSAM
and a multitude of
third party software

the complete source for
... outsourcing ...

1-800-443-8797

14300 Sullyfield Circle
Chantilly, Virginia 22021

REMOTE PROCESSING

PERSONALIZED SERVICE

- Guaranteed Service Levels
- Peak Load Processing
- Satellite Communications
- Fixed Pricing
- Disaster Recovery Services
- Printing & Mail Services
- VM/XA, MVS/XA, DOS/VSE



Agway Data Services Inc.

Call 1-800-ADS-7112

"Committed to Customer Satisfaction"

COST-EFFECTIVE COMPUTING SERVICES for TODAY and... TOMORROW

COMDISCO COMPUTING SERVICES CORP.

Provides you with:

REMOTE COMPUTING COMPUTER OUTSOURCING FACILITY MANAGEMENT

Featuring:

- IBM® CPUs and Peripherals
- Systems Software:
MVS/XA, TSO/E, ISPF/PDF,
CICS, VM/XA, VM/SP, HPO, CMS
- Application Software:
Database Management
Application Development
4/GLs Graphics
Statistical Analysis
- Multiple Communications
Methods
- Technical Support
- Automated Tape Handling
- ULTRA-Secure Data Center
- Advanced Laser Printing
- Pricing to fit your needs

Call: Robert Marino
201-896-3011

COMDISCO

COMDISCO COMPUTING
SERVICES CORP.

430 Gotham Parkway, Carlstadt, NJ 07072

STAT-TAB

OUTSOURCING TIMESHARING

FEATURES

- IBM® and non-IBM® hardware
- UPS, battery, dual system power backup
- Automated print distribution
- 24-hour 7-day processing
- Full technical support
- Network specialists
- Migration support
- Laser printing: sheet & continuous form

OPERATING ENVIRONMENTS

MVS/XA CICS VM/XA
TSO/E DB2 CMS
ISPF/PDF IMS/DB/DC
VM-MAGIC VPS
FOCUS DOS/VSE

PRODUCTIVITY/ DEVELOPMENT AIDS

SAS EASYTRIEVE PLUS
FILEAID ABENDAID
SPREADSHEET BODM
IAM COMPAREX
XCOM 6.2 E-MAIL
ACCTG. PKGS. XICS

COMMUNICATIONS/ NETWORKING

T1 SUPPORT TYMNET
TOKEN RING NJE
PROTOCOL CONVERSIONS
PC-HOST SUPPORT
...and much, much more

CALL JOE BALSAMO
(708) 449-2800

STAT-TAB

a division of
CREATIVE
AUTOMATION
COMPANY
220 Fencil Lane
Hillside, IL 60162
Serving the Nation
Since 1936

TRAINING

Retraining for changing times

As IS moves ahead, professionals are forced to learn or perish

BY KATIE CRANE
SPECIAL TO CW

Information systems veterans who have watched their profession grow since its infancy are now facing a hard-boiled choice: retrain or be replaced.

To accomplish this, IS executives must alter their outlook from one that is strictly technical to one that also focuses on business strategies, says Bob Slusser, vice president of IS management at Northrop Corp.'s Aircraft Division in Hawthorne, Calif. Those who don't, he says, may lose their jobs.

Furthermore, the threat doesn't just apply to top IS executives, says Kay Redditt, president of Cognitech Corp. in Easton, Conn. She insists that systems professionals must also change to reflect the cultural shift in IS organizations today. While there is still a demand for technical expertise, there is also a stronger need for negotiating abilities, interpersonal skills and business savvy as companies insist that IS professionals develop a business perspective. Even systems analysts are expected to stop being experts and become consultants to users, she says.

Train to remain

It boils down to this: "Retrain or die," says Lewis Leeburg, director of the Information Systems Research Program at the Anderson School at the University of California, Los Angeles (UCLA), one of the many programs attempting to address

these issues. He says he believes training scenarios will vary depending on the structure of the IS organization, the nature of the business, its corporate culture and the current skills and attitudes of the IS professionals. But in one way or another, they have to change. For many, that means retraining.

Concurrent with the tough realities facing veteran IS executives, firms are also grappling with their own issues — namely, whether to outsource or hire outsiders to fill those roles rather than re-educate current employees.

Many of Redditt's clients are recruiting business school graduates on the theory that it is easier to teach them technical skills than it is to teach veterans the interpersonal communications, negotiation and facilitation skills they would need to change.

Even retrained IS executives can become victims of the Peter Principle, says Bill Harris, chairman of Behnke Harris Associates, a management consulting firm in New York. Many professionals who acquire the business acumen don't always have the political savvy to deal with the business' cultural demands. "For this reason, many companies turn to business-trained executives to replace or step in over the IS manager," he says.

However, the strategy of replacement doesn't always work, says Richard Kish,

vice president of MIS at Waldenbooks in Stamford, Conn. Kish admits that he falls more into a younger generation, having risen to his current position in just 12 years. But he has built his career on a strong base of technical skills. The business savvy came later as he learned how to discuss technical decisions in business terms.

"My boss doesn't want to know we're putting in an ES/9000 next year; he wants to know if that means we can expand our tele-ordering operations," Kish acknowledges that his kind of thinking may not be widespread and that "there are still plenty of folks who have yet to change."

Fortunately, many companies opt for the retraining rather than replacement. They are developing in-house programs or sending employees elsewhere for assistance.

The Association for Systems Management

(ASM) offers courses and seminars to help IS veterans learn about their new roles. Among the most effective ASM offerings are the local chapter meetings, says Charles Black, director of education. The members determine the programming, and more often than not, a typical dinner meeting will focus on a business topic such as, "How to sell your ideas," rather than a technical topic.

Slusser cites accelerated management programs such as those at Harvard University and Stanford University and programs such as Leeburg's at UCLA as the most frequent sources of retraining for IS people, particularly those at the top.

However, while plenty of companies are addressing the need for skills training, little is being done to address attitude change, Redditt says.

That's why Harris advocates that chief information officers address retraining within a larger context. He sees it as a vital part of the total IS planning process, first tying each IS project to some strategic or tactical business objective, then defining the resources needed to do the job well. Seen in that context, he says, "There will probably always be a need to refocus, retrain and acquire new skills."

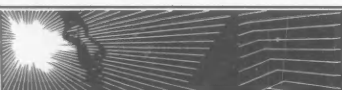
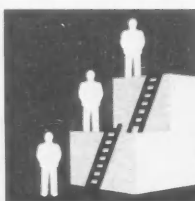
Map out a course

Joe Izzo, vice president of information technology at A.T. Kearney in Santa Monica, Calif., agrees with this approach but adds one caveat: These higher-level IS executives must start with a vision and then map out a very purposeful program for retraining selectively, starting with themselves. "You're on the wrong track if you're trying to retrain the entire IS organization," he insists.

The other side of the argument is that retraining responsibilities shouldn't rest entirely on a company's shoulders. "Those of us who have survived have been through a half-dozen evolutionary changes. If you don't change, you're history a long time ago!" says Gary Kirkham, a 25-year veteran of the profession now at Forecasting Planning Associates in Dallas. The ones who want to stay on the leading edge will take the initiative themselves, he adds.

"It's a tough world out there. Not everyone will survive the evolution of this species," Kirkham says.

Crane is a free-lance writer based in Norwich, Vt.



PROMOTING A BETTER UNDERSTANDING OF INFORMATION ENGINEERING

CEC is pleased to present the 1991 public offerings of our Information Engineering courses.

Course	Date	Location	Price/Student
IE/Planning	May 6-8	Chicago	\$ 895.00
IE/Analysis	Feb. 4-6	Atlanta	\$ 895.00
	April 15-17	Detroit	\$ 895.00
	May 13-15	Los Angeles	\$ 895.00
	June 3-5	New York	\$ 895.00
IE/Design	March 4-7	Atlanta	\$1195.00
	May 20-23	Detroit	\$1195.00
	June 17-20	Los Angeles	\$1195.00

For more information about our offerings, please contact the CEC Education Coordinator at:

(313) 569-0900

cec

"The IE Practitioners"

18620 W. 10 Mile Rd. • Southfield, MI 48075-2667

C & UNIX

\$750/person 5 days

Special prices for multiple employees

Over 80 classes completed with fortune 500 companies

CET

(214) 285-5599

Instructor-Led Mainframe Training and Development for IBM and related products.

Interact
INFORMATION SERVICES, INC.

914-332-6100
(Within NYS)

800-628-5471
(Outside NYS)

Student Sign-up System

For: Corp. Information Centers/
Training Companies

- PC Lan (Multi-User)
- Student Signups
- Invoicing
- Scheduling
- Management Reporting

Free Demo Disk
Call (919) 480-0071

Computer Decisions
PO Box 80294
Raleigh, NC 27623

Computerworld's

Training Pages

Gives you the opportunity to reach over 612,000 potential attendees for your seminar/conference!

For more information, call:

800/
343-6474

(In MA, 508/879-0700)

COMPUTERWORLD

Training Pages
give you
cost-effective reach!

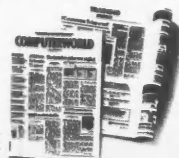
That's because *Computerworld's* training Pages give you the most widespread reach available to management and staff in America's IS departments - the departments that directly control America's IS training dollars.

And for good reason *Computerworld* is the best read publication in America's IS departments - the departments that directly control nearly 80% of the \$233 billion US market for all ranges of computer software, hardware, data communications equipment, services and staff.

What's more *Computerworld's* Training Pages lead buyers to your ad with a weekly Training editorial feature that anchors the section and your ad. Whether it's topics like "Unraveling SQL for MIS pros," or "Finessing the training contract," *Computerworld's* Training Pages deliver pertinent, advice-oriented editorial to *Computerworld's* readers every week.

COMPUTERWORLD

Where all computer buyers and sellers go to market.



SALES OFFICES

Publisher/Fritz Landmann

Senior Vice-President/National Sales Director/Kevin Har-
old, COMPUTERWORLD, 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171 (800) 878-0700

BOSTON: Regional Vice-President - North/David Peterson,
Sr. District Managers/Bill Cadigan, Sherry Driscoll, District
Manager/John W. Harts, Sales Assistants/Alisa Longley, Lisa
Bonaccorso, Linda Chilton, **COMPUTERWORLD, 375 Co-**
chituate Road, Box 9171, Framingham, MA 01701-9171
(800) 878-0700

CHICAGO: Regional Vice-President - Midwest/Kevin
McPherson, Senior District Manager/Larry Cramer, Sales
Assistants/Kathy Sullivan, Carol Lange, **COMPUTER-**
WORLD, 10400 West Higgins Road, Suite 300, Rose-
mont, IL 60018 (708) 827-4433

NEW YORK: Regional Vice-President - East/Bernie Hock-
wender, District Managers/Fred LoSapio, Paula D'Amico,
Sales Assistants/Susan Kucic, Patricia DeBise, **COMPU-**
TERWORLD, Mack Center 1, 365 West Passaic St., Ro-
chelle Park, NJ 07662 (201) 967-0300

LOS ANGELES: Regional Vice-President - West/Michele
O'Connor Abrams, Southwest Regional Manager/Fran
Conner, Sales Assistant/Bev Raus, **COMPUTERWORLD,**
18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714)
261-1230

SAN FRANCISCO: Regional Vice-President - West/Mi-
chela O'Connor Abrams, Senior District Manager/Emile
Chamberlain, District Managers/Alicia Sarbellia, Michele
Gorus, John J. Flood, Sales Assistants/Nancy Zeltman,
Chris Kobayashi, Carol Lacasse, Lisa Cremarosa **COMPU-**
TERWORLD, 500 Airport Boulevard, Suite 400, Burlin-
game, CA 94010 (415) 347-0555

ATLANTA: Regional Vice-President - East/Bernie Hock-
wender, Sales Assistant/Debra Brown, **COMPUTER-**
WORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA
30319 (404) 364-0758

DALLAS: Regional Vice-President - Midwest/Kevin
McPherson, Southwest Regional Manager/John Zeltman,
Sales Assistant/Brenda Shipman, **COMPUTERWORLD,**
14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214)
233-0862

WASHINGTON, D.C.: Regional Vice-President - East/Ber-
nie Hockwender, District Manager/Paula D'Amico, **COMPU-**
TERWORLD, Mack Center 1, 365 West Passaic St., Ro-
chelle Park, NJ 07662 (201) 967-1350

CW PUBLISHING/INC.

An IDG Company: The World's Leader in Information Services on Information Technology.

Fritz Landmann
President & Publisher

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 800-878-0700, Telex: 96-1153, FAX: 508-872-8564

Val Land
Senior Vice-President
Special Publications Division

Kevin Harold
Senior Vice-President
National Sales Director

Matthew Smith
Senior Vice-President
Chief Financial Officer

FINANCE Controller, Mark Sullivan

SALES Advertising Director, Carolyn Novack, Vice President Classified Advertising, John Corrigan,
Marketing Director, Derek E. Hultzy, Classified Operations Director, Cynthia Delany

Display Advertising Production Manager, Maureen Hanley, Classified Sales Supervisor, Jay Novack
MARKETING Vice President/Business Development, Jan Harper, Manager, Advertising, Mary Doyle,
Account Manager, Marketing Communications, Elizabeth Phillips, Manager, Trade Show & Conventions, Audrey Shohan.

CIRCULATION Director of Circulation Management, Maureen Burke, Director of Circulation Promotion, Carol Spach,
PRODUCTION Vice President/Manufacturing, Leigh Hometh, Director of Publishing Technology, Carol Polack,
Production Manager, Beverly Wolff

PUBLISHER'S OFFICE Assistant to the President, Karen Elliott,
Assistant to the Senior Vice-President/National Sales Director, Nancy Gibbs,
Assistant to the Senior Vice-President/Special Publication Division, Libby Levinson

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argente, CGO Comunicaciones S.A.,
Av. Belgrano 400/410, CP 1092 Buenos Aires, Phone:
(011) 54 134-0553, Telex: 2800 22422 ARS

ARAB: S.W. Chan, Asia Computerworld Communications
Ltd., 701-4 Kian Chung Bldg, 54 Jaffe Road, Wanchai,
Hong Kong, Phone: (011) 852 5 961 3248, Fax: (011)
852 5 86 10933

AUSTRIA: Alex Proter, CGO Communications P. Ltd.,
37-43 Brandauer Platz, Dornbach, NW 1005, Vienna,
(011) 61 2 4393133, Telex: (700) AT4752 DOWWOF, Fax:
(011) 61 2 439 5512

AUSTRALIA: Marjorie Weiss, CGO Publications, Vestra
Glen S.H., Deception Rd, 51070 West, Australia, Phone:
(011) 43 521 10 31 G, Telex: (847) 115542 (SCVH) Fax:
(011) 43 523 05 08 33

BRAZIL: New York, Computerworld do Brasil Ltda, Praça
Fonseca, 15/28 Andar, 2031 Rio de Janeiro, RJ, Brazil,
Phone: (011) 52 21 240, Telex: (011) 21 3030 BR,
Sao Paulo: Computerworld do Brasil Ltda, Rua Joaquim
Fonseca, 488/3 Andar, CP 04334, Sao Paulo, Brazil,
(011) 55 11 852 8536, Telex: (011) 11 52017 (WORO) Fax:
(011) 55 11 852 8536

COLUMBIA: Heli Abel Toranzo, La Nueva Ley, Computer-
world Columbia, Torre 22, 36-38 Calle, Apartado Aereo
54018, Bogota, D.C. Colombia, Tel: (011) 57 248 9010

GERMANY: Peter Engel, CGO Denmark A/S, Kungälv
4 Box 2000 Västervik, Sweden, Tel: (011) 46 36 442900, Telex:
(855) 31566, Fax: (011) 46 36 442033

FRANCE: Francois Chaussonnet, CGO Communications
S.A., Immeuble La Fayette, 2, Place des Vosges, Code
65, 92051 Paris La Defense, France, Tel: (011) 33 1 4904
7900, Telex: (842) 013234F, Fax: (011) 33 1 4904 7800

HUNGARY: Dávid Földes, Computerworld Informatics Co.,
H-117, 158 Budapest, Hungary, Phone: (011) 3611
221 452, Telex: (861) 225307 (GOFH) H, Fax: (011) 3611
421 965

INDIA: S.K. Bhargava, Media Transmex India Ltd., 102 An-
and Lok, New Delhi 110049, India, Tel: (011) 91 11 844
0110, Fax: (011) 91 11 643 2950

ITALY: Umberto Costantini, Computer Publishing Group
CPG, Via Vite 20127 Milano, Italy, Phone: (011) 39 2
2013402, Telex: 3243 35318, Fax: (011) 39 2 264
0737

JAPAN: Bill Power, CGO Communications/Japan, Hoshida
18B Bldg, 5-7 Komaba, Chiyoda-ku, Tokyo 102, Japan,
Tel: (011) 81 3 222 6411, Telex: (781) 252 4217, Fax:
(011) 81 3 222 6556

MEXICO: Henry Morales, Computerworld Mexico S.A. de
C.V., Douglas 21-2, Mexico City 7 D.F., Colonia Roma,
06700 Mexico, Tel: (011) 52 5 514 4218 or 5135, Telex:
(363) 177 1300 (ACIAME), Fax: (011) 52 5 11 4800

THE NETHERLANDS: Rudi Bakker, CGO Communications
B.V., de Ruiter Polderweg 18, 1817 SA Amsterdam, The
Netherlands, Tel: (011) 30 20 56 5426/564 5818, Telex:
(844) 18242 (DOWCM NL), Fax: (011) 30 20 578 006

CLASSIFIED ADVERTISING SALES:

Vice President/Classified Advertising/John Corrigan, Mar-
keting Director/Derek E. Hultzy, 375 Cochituate Rd., Fra-
mingham, MA 01701-9171 (800) 343-8474, in MA (800)
878-0700

PRODUCT CLASSIFIED ADVERTISING:

East: Account Manager/Paul Bonamico, 375 Cochituate
Rd., Framingham, MA 01701-9171 (800) 343-8474, in
MA (800) 878-0700

West: Account Executive/Bill Orona, 375 Cochituate
Rd., Framingham, MA 01701-9171 (800) 343-8474, in
MA (800) 878-0700

RECRUITMENT ADVERTISING SALES OFFICES:
New England: Regional Manager/Nancy Perovai, 375 Co-
chituate Rd., Framingham, MA 01701-9171 (800) 343-
8474, in MA (800) 878-0700, Account Executive/Andrew
Rosen, (800) 343-8474, in MA (800) 878-0700

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack
Center 1, 365 West Passaic St., Rochelle Park, NJ 07662
(201) 967-1350, Account Executive/Caryn Diott, (800)
343-8474

South-Atlantic: Regional Manager/Katie Kress, R304
Professional Hill Drive, Fairfax, VA 22031 (703) 573-
4115, Sr. Account Executive/Pauline Smith (800) 343-
8474

Midwest: Regional Manager/Pat Powers, O'Hare Corp.
Twr 1, 10400 W. Higgins Rd., Ste. 300, Rosemont, IL
60018 (708) 827-4433, Account Executive/Ellen Casey
(800) 343-8474

West: Regional Manager/Barbara Murphy, 18008 Sky-
park Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164,
Account Executive/Christopher Glenn (800) 343-8474

DIRECT RESPONSE CARDS:
East: Account Manager/Norma Tamburino, Mack Center
1, 365 West Passaic St., Rochelle Park, NJ 07662 (201)
587-0090

West: Account Executive/Jill Halbert, 18008 Skypark Cir-
cle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD, 375**
Cochituate Road, Box 9171, Framingham, MA 01701-
9171 (800) 878-0700

West Coast Marketing Manager/Leslie Barner, 3350 West
Bayshore Road, Suite 201, Palo Alto, CA 94303 (415)
424-1001

ADVERTISERS INDEX

Applied Business Technology.....	65
AT&T.....	20-21, 36-37, 78-79, C3
Bachman Information Systems.....	10
CGI Systems.....	74-75
Cipher Data.....	81, 83
Communications Research Group.....	18
Compaq Computer Corp.....	52-53
Computer Associates.....	5, 70-71, C4
Computerland.....	54-55
CW Circulation.....	73
CW Editorial Reprints.....	76
Digital Equipment Corp.....	57-60
Epson America.....	48-49
Hewlett-Packard.....	16-17
IBM.....	28, 62-63
IDC.....	72
Information Resources.....	34, 35
Knowledgeware.....	68-69
Legent Corp.....	23
Micro Focus.....	37
Napsoft.....	29
NCR Corp.....	44-45
NEC.....	40
Northern Telecom.....	66-67
On-Line Software International.....	14, 42-43
Oracle Corp.....	7, 9, 11
SAS Institute.....	19
Software AG.....	15
Storage Technology.....	68
Sybase, Inc.....	13
3Com Corp.....	46-47
Syncsort.....	3
Telebit.....	38-39
Texas Instruments.....	30-31
Walker Interactive.....	32
Wollongong Group.....	26-27
XDB Systems.....	41

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:

COMPUTERWORLD, P.O. Box 2043,
Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name	Name	Title	Address	City	State	Zip
Company						
City	State	Zip				

Address shown: ☐ Home ☐ Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

1-800-669-1002

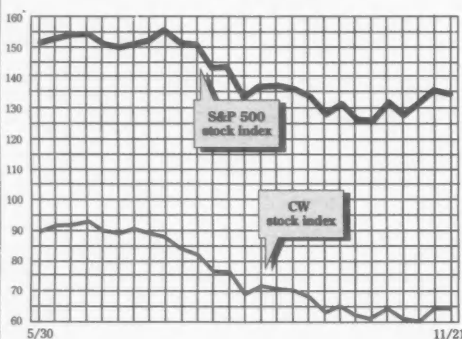
Outside U.S. call: (614) 382-3322



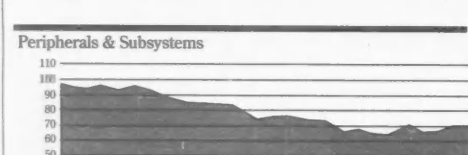
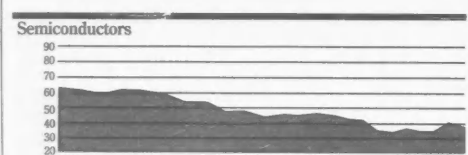
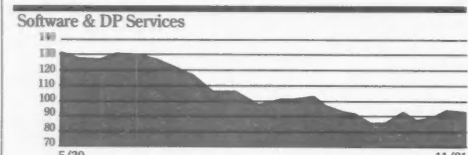
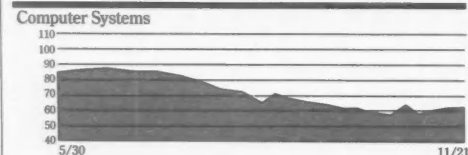
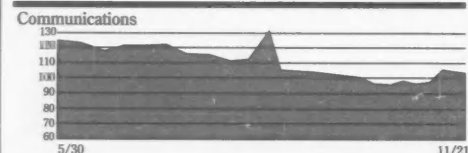
COMPUTERWORLD

P.O. Box 2043, Marion, Ohio 43305

STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	105.3	102.9
Computer Systems	63.4	63.6
Software & DP Services	94.7	92.4
Semiconductors	40.1	38.7
Peripherals & Subsystems	70.7	70.4
Leasing Companies	47.7	50.7
Composite Index	64.7	64.4
S&P 500 Index	135.3	134.9



Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, NOV. 20, 1990

EXCH	52-WEEK RANGE	PRICE NOV. 20, 1990	WEEK NET CHG	WEEK PCT CHG
Communications and Network Services				
N AMERICAN INFO TECHS CORP	68 53	66.375	0.8	1.1
N ANDREW CORP	26 16	19.5	0.8	4.0
Q ARTEL COMM CORP	10 2	2.25	-0.3	-10.0
Q AT&T	47 30	32.5	-1.3	-3.7
Q AWANTX INC	4 2	2.375	0.0	0.0
N AYON CORP	17 10	11	0.1	1.1
N BELL ATLANTIC CORP	57 40	53.125	-0.1	-0.2
N BELL SOUTH CORP	59 49	53.125	0.0	0.0
Q COMPRESSION LABS INC	16 7	13.875	-0.1	-0.9
Q CONTEL CORP	36 23	35	-0.8	-2.2
Q DATA SWITCH CORP	4 2	3	0.1	4.3
Q DIGITAL COMM ASSOC	27 9	11.75	-0.1	-1.1
Q DYNATECH CORP	19 12	15	-0.3	-1.6
Q EMBRONICS INTL INC	13 5	7.375	-1.8	-18.1
Q GANDALF TECHNOLOGIES	6 2	2.875	0.1	4.5
N GENERAL DATA COMM INDS	5 2	2	-0.1	-5.9
N GTE CORP	36 24	27.875	-1.0	-3.5
Q INFOTRON SYS CORP	9 1	47	-0.1	-11.1
N ITT CORP	61 40	41.75	0.5	1.2
N M A COM INC	6 3	5.625	0.8	12.5
Q MCI COMMUNICATIONS CORP	48 19	19	-12.9	-60.4
Q NETWORK EQUIP TECH INC	34 15	6.5	0.4	6.1
Q NETWORK SYS CORP	15 8	10.25	-0.1	-1.2
N NORTHERN TELECOM LTD	30 21	26.375	-0.3	-1.0
Q NYNEX CORP	92 67	70.5	-0.9	-1.2
N PACIFIC TELECOM GROUP	52 36	44.375	-1.9	-4.1
Q PENNCO CORP	9 5	8.5	0.0	0.0
N PLESSEY PLC	42 39	0.01	0.0	0.0
N SCIENTIFIC ATLANTA INC	29 9	11.75	0.6	5.6
Q SOUTHERN BELL CORP	68 47	52.5	-0.5	-0.9
Q 3 COM CORP	19 5	7.5	-0.5	-6.3
Q U S WEST INC	41 32	37.5	0.6	1.7

Computer Systems

Q ALLIANT COMPUTER SYS	9 1	1.125	0.1	12.5
Q ALPHA MICROSYSTEMS	5 1	2.625	0.8	31.3
Q AMDAHL CORP	19 10	13.5	0.1	0.9
Q APPLE COMPUTER INC	48 24	35.5	-1.5	-4.1
Q AST RESH INC	27 10	25	-0.4	-1.5
N BOLT BERANEK & NEWMAN	8 4	4.375	-0.1	-2.8
Q COMPAQ COMPUTER CORP	68 36	49.875	0.0	0.0
Q COMMODORE INTL INC	12 5	9	1.1	14.3
Q COMPUTER AUTOMATION INC	6 0	0.938	0.0	0.0
Q CONTROL DATA CORP	22 8	11.125	-0.4	-25.0
N CRAY RESH INC	51 20	27.875	0.0	0.0
N DATA GEN CORP	14 4	4.375	0.4	9.4
Q DATAPoint CORP	5 1	1.125	-0.4	-25.0
Q DELL COMPUTER CORP	14 5	12.5	0.4	3.1
N DIGITAL EQUIP CORP	95 46	51.75	-0.5	-1.0
Q FLOATING POINT SYS INC	4 0	1.375	0.1	10.0
N HARRIS CORP	36 14	19	0.8	4.1
N HEWLETT PACKARD CO	50 25	28	-0.3	-0.9
N HONEYWELL INC	111 71	88.625	-1.9	-2.1
N IBM	123 93	113.375	-0.1	-0.1
Q INFORMATION INTL INC	14 8	9.125	0.4	4.3
Q IPL SYS INC	14 5	12.75	2.5	24.4
N MAIL BASIC FOUR INC	4 1	1	0.1	10.0
N MATSUSHITA ELEC IND LTD	166 116	124.25	-2.0	-1.6
Q MENTOR GRAPHICS CORP	26 9	11.75	0.5	4.4
Q NSI INC	1 0	0.125	0.0	-19.9
N NCR CORP	72 45	54.25	-2.4	-4.2
Q PYRAMID TECHNOLOGY	36 12	12.75	-2.6	-17.1
Q SEQUENT COMP SYS INC	34 13	17.75	-1.9	-9.6
Q SUN MICROSYSTEM INC	37 15	18.25	-0.4	-2.0
Q SYMBOLICS INC	2 0	0.25	0.0	0.0
N TANDEN COMPUTERS INC	30 9	12.25	-0.3	-2.0
N TANDY CORP	44 24	26.25	-2.6	-9.1
N ULTIMATE CORP	10 1	1.625	-0.1	-7.1
N UNISYS CORP	17 2	2.875	-0.1	-4.2
A WANG LABS INC	6 3	2.875	-0.1	-4.2

Software & DP Services

Q AMERICAN MGMT SYS INC	20 11	15.25	0.4	2.5
N AMERICAN SOFTWARE INC	18 8	10.125	-1.3	-11.0
N ANACOMP INC	5 1	2	0.3	-11.1
Q ANALYSTS INTL CORP	24 10	13	0.3	2.0
Q ASTON TATE	15 5	8.25	0.8	9.6
N AUTO DATA PROCESSING	60 45	54	0.0	0.0
Q AUTODESK INC	60 32	43.25	-2.5	-5.5
Q BMC SOFTWARE INC	30 17	23	0.5	2.3
N BUSINESSLAND INC	12 1	1.5	-0.3	-14.3
Q COGNOS INC	10 4	8.125	0.8	10.2
Q COMPUTER ASSOC INTL INC	17 4	8	0.9	11.3
Q COMPUTER HORIZONS CORP	17 8	13.625	-0.8	-5.2
Q COMPUTER SCIENCES CORP	59 37	46.75	0.9	1.9
Q COMPUTER TASK GROUP INC	12 7	7.25	0.4	5.5
Q COMSHARE INC	25 14	19	1.0	5.6
Q CORPORATE SOFTWARE	16 4	7.25	0.3	3.6
N GENERAL MTRS (CLS E)	38 24	36.5	1.6	4.7
Q GOAL SYSTEMS INTL	18 8	9.25	0.0	0.0
Q HOGAN SYS INC	7 2	2.125	-0.3	-10.5
Q INFORMIX CORP	18 4	3.875	-0.1	-3.1
Q INTELLICORP INC	8 1	1.75	-0.3	-15.2
Q LEGENT CORP	31 17	22.75	-0.3	-1.1
Q LOTUS DEV CORP	39 13	18.75	1.0	5.6
Q MICROSOFT CORP	81 38	68.25	-1.3	-1.8
Q NATIONAL DATA CORP	35 8	13.125	-0.8	-5.4
Q ONLINE SOFTWARE INTL INC	11 7	4.125	0.0	0.0
Q ORACLE SYS CORP	188 5	6.375	0.4	6.3
N PANGORPH SYS INC	19 7	1.625	-0.1	-7.1
Q PHOENIX TECHNOLOGIES INC	5 1	39.25	0.0	0.0
N POLICY MGMT SYS CORP	43 30	5.5	0.0	0.0
Q PROGRAMMING & SYS INC	13 5	5.5	0.0	0.0
Q RELATIONAL TECH INC	10 3	9.125	0.0	0.0
Q REYNOLDS & REYNOLDS CO	27 12	15.5	1.0	6.8
Q SAGE SOFTWARE INC	16 8	11	0.9	8.6
Q SEI CORP	22 15	16.75	0.0	0.0
Q SHARE MED SYS CORP	17 12	16	0.8	4.8
Q SOFTWARE PUBG CORP	28 12	16.75	-0.8	-4.3
Q STERLING SOFTWARE INC	11 6	12.25	-0.1	-1.8
Q SUNGARD DATA SYS INC	26 10	12.25	-0.8	-6.8
N SYSTEM CENTER INC	25 6	8.625	-0.1	-1.4
N SYS. SOFT INC	29 13	23.75	1.3	5.6
Q WORDSTAR	2 1	1.219	0.1	8.4

Semiconductors

N ADV MICRO DEVICES INC	11 4	4.125	-0.6	-13.2
Q ANALOG DEVICES INC	10 6	5.75	-0.1	-2.1
Q ANALOGIC CORP	12 8	8.5	0.1	1.2
Q CHIPS & TECHNOLOGIES INC	24 5	7.75	0.6	8.8
Q INTEL CORP	52 28	36.75	-1.1	-3.0
Q MICRON TECHNOLOGY INC	16 7	8.875	-0.8	-7.8
N MOTOROLA INC	88 51	51.375	-4.6	-8.3
N NATL SEMICONDUCTOR	9 3	3.5	-0.4	-9.7
N TEXAS INSTRS INC	44 23	27.25	-0.5	-1.8
A WESTERN DIGITAL CORP	15 4	5	-0.3	-4.8

Peripherals

Q ALLOY COMP	2 0	0.438	0.1	27.3
N AMINT INC	1 1	1.5	-0.3	-14.3
Q AUTO TROL TECH CORP	4 2	2.063	0.0	0.0
Q BANCORP INC	24 10	12.75	0.8	6.3
Q COGNITRONICS INC	7 3	5.875	0.3	4.4
Q CONNER PERIPHERALS	31 11	24.625	-0.8	-3.0
A DATARAM CORP	22 7	7.25	-1.5	-17.1
N EASTMAN KODAK CO	44 34	42.75	0.8	1.8
N E MC CORP MASS	10 3	8.625	-0.4	-4.2
Q EMULEX CORP	9 4	5.125	-0.1	-2.4
Q ICOT CORP	35 14	17	1.3	7.9
Q EVANS & SUTHERLAND	2 0	0.313	-0.1	-16.5
Q INTERLEAF INC	8 3	3.375	-0.1	-3.6
Q IOMEGA CORP	6 3	4.125	-0.3	-5.7
Q MASSOR SYS CORP	3 0	0.25	0.1	33.0
Q MAXTOR CORP	17 4	4.875	0.1	2.6
Q MICROPOLIS CORP	10 3	7.25	0.9	13.7
N MINNESOTA MNG & MFG CO	91 74	80.625	0.1	0.2
Q PERSONAL COMP PRODUCTS INC	5 4	3.625	0.0	0.0
Q PRINTRONIX INC	15 6	8.875	-0.1	-1.4
N QMS INC	21 9	12.25	-1.0	-7.5
Q QUANTUM CORP	26 9	20	0.0	0.0
N RECOGNITION EQUIP INC	8 4	4.5	-0.1	-2.7
Q REXON INC	10 4	5.625	0.1	2.3
Q SEAGATE TECHNOLOGY	20 6	8.875	-0.3	-2.7
N STORAGE TECH CORP	35 11	18.5	-1.0	-5.1
Q TANDON CORP	4 1	1.75	0.0	1.8
N TEKTRONIX INC	19 12	16.75	-0.4	-2.2
Q TELEVIDEO SYS INC	1 0	0.25	0.0	0.0
N XEROX CORP	60 29	34.125	0.0	0.0

Leasing Companies

N CAPITAL ASSOC INTL INC	5 1	0.688	-0.1	-8.3
N COMDISCO INC	29 15	15.5	-1.0	-6.1
N LDC CORPORATION	18 9	9.5	0.0	0.0
Q SELECTERM INC	7 3	3.25	0.0	0.0

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

Slim pickin's

Some tech firms eat losses, but most investors weren't dining

Either most investors were home gobbling turkey or someone posted a "Do Not Enter" sign at the end of Wall Street last week. With a few exceptions, Thanksgiving's shortened work week was slower than slow in the technology sector.

Evidently, the summit between NCR Corp. and AT&T was still a cause celebre last week. However, contrary to recent events, NCR came out the loser last week, at least by Tuesday's close — down 4 1/4 points to 54 1/4. AT&T skipped up 1/2 a point to close Tuesday at 32 1/4.

Rivals MCI Communications Corp. and United Telecom — U.S. Sprint Communications Co.'s parent company — each suffered large hits. MCI skidded 3 1/2 points by Tuesday to close at 19 after announcing a restructuring plan the previous week and warning that they will likely be down quarters to come. United Telecom, meanwhile, dropped 1 1/2 points to 20 1/2.

Most other movement among technology shares was scant, with many 1/4-point changes in the semiconductor sector. The following firms fell 1/4 of a point last week: Motorola, Inc. to 51 1/4; National Semiconductor Corp. to 3 1/4; and Intel Corp. to 36 1/4. Texas Instruments, Inc., however, picked up 1/4 of a point, closing at 27 1/4.

Hewlett-Packard Co. reported a fourth-quarter profit drop on Nov. 16, then closed at 28, down 3/4 of a point. Elsewhere in hardware, Sun Microsystems, Inc. added 1/4 of a point to 18 1/4 and Apple Computer, Inc. advanced 1/4 of a notch to 35 1/4. Digital Equipment Corp. lost 1/4 a point to 51 1/4 and IBM shed 1/4 of a point to 113 1/4.

Personal computer software maker Autodesk, Inc. stumbled 1 1/4 points to 43 1/4, breaking its three-week upward trajectory. Other big firms gained, however, including Lotus Development Corp., which jumped 1/2 a point to 18 1/4, and Microsoft Corp., which moved up 1/4 of a point to 68 1/4.

KIM S. NASH

NEWS SHORTS

New PCs from Memorex Telex

Tulsa, Okla.-based Memorex Telex Corp. fleshed out its personal computer hardware line last week with several PCs, a synchronous or asynchronous remote controller and a token-ring adapter. Memorex's Model 7035 PC is based on Intel Corp.'s 80386SX chip and is priced starting at \$2,295. The company also released 80286- and 386SX-based boxes that can display four simultaneous host sessions in an IBM 3270 environment. The PCs sell for \$7,495 and \$8,295, respectively. The firm's STP 6541 Multifunction Communications Controller costs \$4,125, and the IBM Personal Computer AT-style or Micro Channel Architecture token-ring adapters cost \$895 and \$925, respectively.

Hyundai loses court battle

A California jury last week ordered Hyundai Electronics America to pay \$450,000 to Lifetime Memory Products, Inc. to resolve a 2-year-old dispute with the Huntington Beach, Calif.-based distributor. The case evolved after Lifetime Memory Products, then known as Columbus International, charged that Hyundai breached a contract to deliver 100,000 dynamic random-access memory chips to the company at \$1.05 each during the U.S. memory chip shortage of 1988. Hyundai said in a written statement that it will appeal the verdict, while an attorney for Lifetime Memory said the company will seek to make Hyundai cover the plaintiff's legal expenses.

Cost of VDT law pegged

San Francisco's proposed VDT ordinance would have a one-time cost of between \$73.2 million and \$120 million, said city budget analyst Harvey Rose. More than 60,000 workers would be covered by the law, which would require work spaces to have adjustable desks and chairs, nonglare lighting and positioning of workers at least one meter from the back of a VDT.

CFOs to watch federal systems

President Bush last week signed legislation establishing chief financial officer positions at 23 federal agencies. The bill also establishes a presidentially appointed super-CFO within the Office of Management and Budget. The CFOs are expected to unsmear agencies' financial systems and prevent fraud.

CDC selling trading-room group

Control Data Corp. last week concluded a six-month search for a buyer for Micrognosis, its \$100 million trading-room systems unit, agreeing to sell to CSK Corp., Japan's largest independent computer service company. CSK officials said they hope to use the Danbury, Conn., company, which provides integrated trading-floor systems, as a springboard for its international business. Terms for the sale were not disclosed.

Printer groups to merge

Storage Technology Corp. in Louisville, Colo., and Siemens Nixdorf Information Systems, Inc. in Burlington, Mass., signed an agreement last week to merge their respective U.S. high-performance, nonimpact printer operations. The joint venture is slated to become operational in January 1991. Upon closing the deal, Siemens Nixdorf will own 51% of the operation, and Storage Tek will own 49%. Storage Tek anticipates that more than 100 of its employees will be transferred to the new entity.

Mosaic faces court woes

The copyright infringement trial of Lotus Development Corp. vs. Mosaic Software concluded last Wednesday in Federal District Court in Boston. During the two-day trial, Judge Robert E. Keeton fined Mosaic \$12,500 for unnecessarily delaying the trial, but Mosaic said it is having difficulty raising the money. If the fine is not paid on time, Mosaic automatically forfeits the trial, a Lotus spokesman said. This may be a moot point, as Keeton told the court he is leaning toward ruling against Mosaic, adding that he cannot envision anything Mosaic may say in a post-trial brief that would change his mind.

Quake threat has Midwest edgy

BY ELLIS BOOKER
CW STAFF

ST. LOUIS — Better safe than sorry. That is how some information systems executives in the Midwest are reacting to a controversial prediction that a major earthquake will rock the region next Monday or Tuesday.

Some data centers have scheduled hot-site recovery testing to coincide with the prediction, and one user contacted by *Computerworld* last week said he made contingency plans on the basis of self-taught meteorologist Iben Browning's prediction of a quake along the New Madrid seismic region. The area is centered in southeast Missouri and northeast Arkansas and extends into parts of Illinois, Indiana, Kentucky, Mississippi and Tennessee.

The Browning prediction, roundly dismissed by geophysicists, holds that there is a 50% chance of a "tidally triggered" quake measuring 6.5 to 7.5 on the Richter scale on Dec. 2 to Dec. 3, give or take two days.

E. D. Jones & Co., a retail brokerage house in a St. Louis suburb, is taking the prediction seriously. "We're not planning on a pre-emptive declaration or positioning people in hot sites, but we want to make sure we can successfully put the pieces back together if it does happen," manager of computer operations Tom Barry said.

According to Barry, his department discussed the possibility of a pre-emptive disaster declaration but backed away after calculating it would cost more than \$500,000 per week.

Meanwhile, the brokerage house, which has 1,600 retail offices in 42 states, is taking extra

precautions. It has hardened its St. Louis headquarters, spending \$20,000 on bracing and securing electrical systems and the cooling and air-conditioning system in its 12,000-sq-ft data center. The company will also pay extra to have its backup data tapes transferred to Kansas City, Mo., for two weeks.

Matter of course

"These are the kinds of things that should be done anyway," said Barry, who reported that many of his counterparts in the

firm's third for the year — had tentatively been scheduled for some time in December, and the fact that it was moved to early December does not indicate undue panic, Moran said.

If someone believes there will be a catastrophe during the critical pre-Christmas season, Moran said, "We're going to listen but not overreact."

Long-distance company AT&T, which has major routes through St. Louis — including the hub for its 800 service — is also bracing for Dec. 3.

WE WANT TO make sure we can successfully put the pieces back together if it does happen."

TOM BARRY
E. D. JONES

St. Louis area are similarly anxious about next week. "A lot of people are taking the same precautions we are . . . and some are taking even more," he said.

If a quake comes, mail-order company House of Lloyd will be in an excellent position, as it will be inside a Comdisco Disaster Recovery Services, Inc. (CDRS) hot site in Wood Dale, Ill.

Jack Moran, vice president of IS at the firm, said the company ships the majority of its orders in the two months before Christmas, "and we're always careful about the fourth quarter." Among other routine precautions, the Kansas City firm outfits all of its 100 IS employees with beepers and adds a backup generator to support the IBM 3090 300E in its data center during this part of the year.

The Wood Dale test — the

"We're taking the prediction seriously," a company spokeswoman said, adding that a team of network engineers has been assembled to reroute traffic and minimize network damage.

"Business has increased about twofold," said Richard B. Zane, president of the North American division of CDRS.

CDRS has not added staff or modified its recovery centers in advance of Dec. 3, according to Zane, although he said the staff had been made aware of the concerns of some customers. "It's really business as usual," he said.

The New Madrid fault was the site of the strongest series of earthquakes in U.S. history in late 1811 and early 1812. Missouri and Arkansas both received two major quakes, estimated to have been in the 7.8 to 8.3 range on the Richter scale.

Hackers

FROM PAGE 1

"It is a new reality — not a virtual reality — that you will go to prison," said William Cook, an assistant U.S. attorney in Chicago. "The sentences reflect the judge's and society's concern that the hackers are trying to use the telecommunications industry as their playground. Well, the playground is closed."

The severe sentences should also send a signal to corporations that have been victimized by computer hackers, Cook said. "It should say that it is worthwhile for you to cooperate when unjustly violated by people who hack into your system and that it is worthwhile in sentencing and in terms of the restitution that we will call for."

The three hackers, members of a self-proclaimed elite group of about 15 hackers called the

Legion of Doom, could have received sentences of between five and 10 years and fines of \$250,000. However, attorneys for the Justice Department recommended lighter sentences, because the trio provided information that was helpful with investigations of other Legion of Doom members.

Darden, who used the handle The Leftist, and Riggs, who called himself The Prophet, pleaded guilty to a conspiracy to commit computer fraud, wire fraud, access code fraud and interstate transportation of stolen property. Grant, who operated as The Urvile and Necron 99, pleaded guilty to a separate count of possession of long-distance telephone access codes with the intent to defraud.

Gail Thackeray, an assistant attorney general in Arizona who has investigated and prosecuted a number of computer-related crimes, said the sentencing indi-

cates that the legal system may be moving toward a more consistent approach to prosecuting computer-related crimes.

The courts are focusing more on the intent of the computer hacker in handing out sentences, Thackeray said. The sentences will be more severe in cases such as the Bellsouth case, in which the hackers carried out "deliberate, vicious attacks" with the intent to do harm. Trespassing in a computer system or engaging in reckless behavior by exploring a system's electronic innards will continue to draw lesser penalties, Thackeray said.

In the days leading up to the sentencing, some security experts said hackers would launch an attack on telecommunications systems as a form of protest. Bellsouth received reports of the threats, but no attempts were made to disrupt the system, said Scott Tier, operations manager at Bellsouth.

Global

FROM PAGE 1

Ltd., both suppliers of IBM-compatible mainframes in addition to proprietary systems, "are flexing their muscles and deciding that they're tired of being the power behind the throne," said Donald Bellomy, director of worldwide market studies at International Data Corp. in Framingham, Mass. "They'd like to be viewed as the computer monarchs that, in fact, they are."

Most of Fujitsu's \$16 billion in annual revenue stems from sales of computers and electronic equipment; roughly one-third of Hitachi's \$42 billion comes from computer-related sales.

In the U.S. arena of IBM-compatible mainframe sales, there are only three players: \$60 billion IBM, \$2 billion Amdahl Corp. in Sunnyvale, Calif., and \$1 billion Hitachi Data Systems Corp. (HDS) in Santa Clara, Calif. Fujitsu holds 43% of Amdahl's stock, while Hitachi owns 80% of HDS stock.

Fujitsu recently acquired Britain-based International Computers Ltd. Hitachi distributes its IBM-compatible machines in Europe through Compax GmbH and in Italy through Ing. C. Olivetti & Co. in addition to HDS' European direct-sales force. The other major Japanese supplier, NEC Corp., sells non-IBM-compatible large systems internationally through Groupe Bull in France.

However, the familiar shape of that global market is slowly but surely changing, posing the possibility that IBM's 80% share of the IBM-compatible world market may slip in the not-too-distant future.

"I expect a slow, steady increase in market share by Hitachi and by Fujitsu, boosting their combined market share from 20% to 30% worldwide," said Mark Hess, program director of IBM large-computer market research at Gartner Group, Inc. in Stamford, Conn.

In Japan, IBM-compatible systems make up just 30% of the installed base. (Installations of Fujitsu's MSP operating system are not included in that figure, although it was originally designed to be compatible with IBM's System 360 architecture.) Market shares shift only slightly from year to year because each vendor depends largely on sales of proprietary operating systems.

The introduction of Unix in Japan, however, would threaten this stable domestic market for Japanese vendors, analysts said. "About 80% of the mainframe market is for upgrades or replacements, so there is not much chance to change software," Jeremy said. "Open systems should reduce this barrier."

"If the yen strengthens, which it probably will, there will be incentive for Japanese companies to buy overseas assets, including software companies and venture start-ups," Jeremy said. "Don't expect the Japanese to

become European computer vendors overnight. It will take 10 years to see results. But now is a good time for them to expand."

Indeed, Japanese vendors see a wide-open world market, including opportunities in fast-growing Asian countries and the robust Unix market in Europe. With their proprietary systems customers firmly in hand at home and the Japanese main-

puter companies," said longtime IBM watcher Bob Djurdjevic, president of Annex Research in Phoenix. But the competition is, after all, formidable: "IBM is bigger than the next five makers put together," Jeremy said. "So a frontal attack by Japanese makers in the U.S. [would be] useless."

The process of gaining greater market share outside Japan seems inexorable. Fujitsu struck in Europe, buying up Britain's ICL. And with General Motors Corp.'s Electronic Data Systems Corp. subsidiary as a 20% partner, Hitachi bought out National Advanced Systems, Inc. in May 1989.

Amdahl, Fujitsu's ally in the U.S. and selected international markets, stressed that it does not relabel Japanese boxes, preferring to use Fujitsu semiconductors and components in its own designs. But despite Fujitsu's 19-year relationship with and partial ownership of Amdahl, there is no legal restriction against the Japanese vendor selling directly in the U.S. The only caveat is that Fujitsu cannot violate Amdahl/Fujitsu cross-licensing patent agreements for specific jointly developed system features.

Fujitsu Chief Executive Officer Takuma Yamamoto termed the long-standing and close relationship with Amdahl, into which Fujitsu infused \$54 million in capital and loans from 1972 to 1976, as a brotherly one. "In mainframes, Amdahl is playing our main role in the U.S.; they're our brother company," he said.

"We have only a subrole, and this situation will not change over the next five to six years."

Even so, IBM must react to Fujitsu's changed role in Europe and in Asia or lose market share. "I don't think there's anything IBM can do over the next five years to stop this," Hess said. "The only possibility is that IBM pulls together its development and product-delivery processes so that there's a flawless rollout of significant new function by 1993."

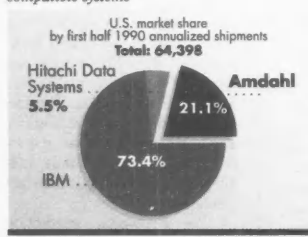
Fujitsu appears to have taken the lead in girding for this major battle — slightly ahead of HDS, which is using the period from 1990 to 1992 to build up its manufacturing capacity. (See story below.)

In recent months, Fujitsu announced a new mainframe Unix product, UXP/M, which is based on AT&T's Unix System V Release 4 as well as a new high-end eight-processor M-1800 mainframe, which overpowers IBM's top-of-the-line, six-way Enterprise System/9000, although neither system is ready for shipment. Fujitsu is said to be building a Unix research capability in the U.S. to augment hundreds of Unix researchers at its home offices in Japan.

Although much larger than Fujitsu, Hitachi generates two-thirds of its revenue from sales of heavy industrial equipment and consumer products. But Hitachi is building a second mainframe factory in Ikena, Japan, to supplement its Odawara Works site west of Tokyo; it is also building a new disk-drive plant in Orleans, France, scheduled to be completed in 1992. And while HDS customers have complained of disk-drive shortages this year, Hitachi has been dou-

On the trail

In the U.S., Fujitsu's partner, Amdahl, has established a strong lead in sales of IBM-compatible systems



Source: Annex Research CW Chart: Doreen St. John

frame market growing at approximately 10% per year, the Japanese are building an infrastructure for overseas markets. That buildup includes hundreds of millions of dollars' worth of investment in research and development labs, field service and software support overseas.

"Up to now, the Japanese manufacturers have made their presence known through minority investments in Western com-

Fujitsu CEO's global agenda

Software, hiring managers still primary problems for Japanese makers

Fujitsu Ltd. Chairman Takuma Yamamoto met with IDG News Service Bureau Chief Lori Valigra in Tokyo recently to discuss the top Japanese mainframe maker's international strategies. Though Fujitsu sits well positioned through strategic alliances with Amdahl Corp. in the U.S. and ICL in Europe and has made strong moves toward adopting Unix as its open systems strategy, Yamamoto said Japanese companies will not change the global mainframe market equation anytime soon.

Fujitsu introduced two main strategies for mainframes this fall: the UXP/M operating system for high-end mainframes and supercomputers that is based on [AT&T's] Unix System V Release 4 and the top-end M-1800 mainframe, which was announced one day before IBM's Enterprise System/9000. How will these two strategies translate into international mar-

kets, especially the U.S. and Europe?

Fujitsu is promoting open systems fairly actively. We will support small computers through mainframes and supercomputers with Unix and Unix with Japanese-language support.

Amdahl has not decided yet whether it will offer our UXP/M Unix... But Amdahl is developing its own high-end system, so it probably will not sell the M-1800 system in the U.S. or Europe. Fujitsu could market the M-1800 in the U.S. directly, but it would be primarily to Japanese corporations there who are already customers.

What are the major obstacles you face in overseas mainframe markets?

Customer support requirements are different in Western countries [than in] Japan. In Japan, customer requirements for support are very strong. That's why it is hard for foreign manufacturers to enlarge their activities in Japan.

For Japanese manufacturers, the overseas market is difficult

because applications software is based on the culture of the society. But in markets where no support is necessary, for example, in personal computers, we are doing well overseas already. In the future, Japanese mainframe manufacturers will work on support overseas.

We're now in the process of changing from a Japanese company only into a global company. The 80% capital participation in ICL is one of the steps we took to globalize. But software is still the primary problem for Japanese makers trying to internationalize. The other problem is hiring and promoting capable business managers in local operations.

What are Fujitsu's mainframe market priorities over the next five years?

The cost of systems support is rising continually, so we plan to introduce more packaged software applications to reduce software development costs for us and our customers. The other priority is supporting and maintaining our customers' assets in our proprietary systems.

NEC on the outside

NEC has remained the outsider in the mainframe market with a non-IBM-compatible strategy. Nonetheless, it has managed to win a strong customer base with its own technology.

"NEC started the ACOS mainframe family in 1979 as a countermeasure to the IBM System/360, which was very strong at the time," said Takehiko Inoue, vice president of NEC's information processing group in Tokyo.

The company's entrance into the mainframe market was, ironically, sponsored by Honeywell, Inc. Not only did NEC outlast Honeywell, but it owns a minority stake in and is the large system supplier to Bull HN Information Systems, Inc., the U.S. subsidiary of Groupe Bull, which encompasses the former computer operations of Honeywell.

"NEC's philosophy is to always pursue an original market for NEC using ACOS, so we have advantages and disadvantages as an IBM competitor," Inoue said. "The advantage is we can use new ideas and special features to improve our mainframes. But with a proprietary system, we cannot use third-party software." To correct that, NEC is also working on developing Unix products in a bid to expand its share of the global large systems market.

In the U.S., NEC has already built up a solid identity in low-end systems and peripherals. And with state-subsidized Groupe Bull under pressure from the French government to resolve its current financial crisis, speculation is rampant that NEC will increase its stake in the French firm.

LORI VALIGRA

Unix evens odds for Japanese

Japanese vendors see Unix as chance to garner mainframe market share

BY JEAN S. BOZMAN
C.W. STAFF
and LORI VALIGRA
IDG NEWS SERVICE

bling the capacity of its plant.

Hitachi has sold its products to U.S. and European accounts through its HDS subsidiary. Now Hitachi is planning a broad-based Unix strategy. "We are thinking of offering a mainframe based on [the Open Software Foundation's] Unix," Endo said. "We're committed to delivering a high-end mainframe by the end of [1991] worldwide."

Unix sales are brisk in Europe, where trade restrictions will fall in 1992. Unix systems also offer a greater degree of application portability from one hardware platform to another.

Outside Europe, the fastest-growing mainframe market is in Asia. "All of this started in Japan," explained Joan Lewick, director of international marketing and services in IBM's corporate offices in Armonk, N.Y. "The outer islands [in Asia] represent a great opportunity for IBM, but they are also a great opportunity for the Japanese computer manufacturers."

The world's computer vendors seem destined to grope for the boundaries of this expanding global marketplace during the next few years. To hold onto its Japanese accounts, IBM created a corps of Japanese-speaking "assignees" who relocate to countries where Japanese firms are setting up shop.

Just one year ago, IBM reorganized its corporate marketing management; now, six executives coordinate IBM account support on a global basis.

By the year 2000, most ob-

servers said, there will be only a handful of global mainframe suppliers, particularly because of the "deep pockets" each player needs to project its products around the world. "They may be consortiums or mergers of the U.S. and European and Japanese firms that exist today," said Jim Belassone, executive vice president of marketing at HDS. "But

No easy task

A long-term view is seen as a prerequisite to challenging IBM's dominance of the worldwide mainframe market

Worldwide mainframe market shares

IBM	51.8%
Fujitsu	9.5%
Hitachi	6.8%
Unisys	6.6%
Amdahl	4.6%
Siemens	2.8%
NEC	2.7%
Others	15.2%

Source: Nikkei, IDC CW Chart: Marie Haines

the battle for mainframe market share will be fought on a global basis, and you have to play on a worldwide basis in order to win."

Speed, however, is not of the essence in this global computer game. "If it takes until the 21st century to do it, so be it," Djurdjevic said.

Valigra is the Tokyo bureau chief for the IDG news service.

Unix is seen by Japanese computer vendors as a wedge into IBM accounts in Europe and the U.S. and also into European accounts that have traditionally bought computers from European makers such as France's Groupe Bull, Germany's Siemens AG, Britain's International Computers Ltd. and Italy's Ing. C. Olivetti & Co.

"The Japanese are being realistic about where the market opportunities lie," said Rikki Kirzner, a senior analyst at Dataquest, Inc. in San Jose, Calif. "They see that with Unix, they can create an installed base that IBM won't be targeting — at least not at first."

Jim Belassone, executive vice president of marketing at Hitachi Data Systems Corp. (HDS), sees another advantage of Unix: It removes IBM's home-court advantage of changing software or hardware standards at will.

"You can think of Unix as a magic bullet that levels the playing field," Belassone said. "With Unix, we will no longer be waiting for IBM architecture and IBM software. Hitachi will be able to exploit its technology as fast as it wants to, without hav-

ing the millstone of waiting for IBM around its neck."

Users in Europe may not feel as tied to their IBM machines as U.S. users, analysts said, largely because their overall investment in IBM technology is smaller.

"Midsized mainframe shops are not as trapped in the IBM MVS environment as large-scale mainframe sites," explained Frank Gens, vice president of technology assessment at Technology Investment Strategies Corp. "As IBM puts a squeeze on customers by applying higher software prices, these will be the first customers to move to other vendors or to open systems environments."

Fujitsu's interest in Unix has become apparent in recent months with the release of UXP/M Unix, based on AT&T's Unix System V Release 4.

Complementary lab

Fujitsu is also said to be building a U.S.-based Unix research facility to supplement its Unix software labs in Japan. Fujitsu is active in the Unix International standards group and in London-based X/Open Ltd.

Amdahl Corp. Chief Executive Officer John Lewis does not rule out some direct Fujitsu sales in the U.S. "There's nothing to stop them from selling a Unix system here," Lewis said. "I

think the open systems marketplace will be wide open, with everyone competing." However, Lewis said he believes that Amdahl's UTS system, now 10 years old, is about two years ahead of AT&T's Unix System V in terms of security and other data management features.

To date, HDS has outpaced Fujitsu in direct sales to U.S. customers. Like Fujitsu, Hitachi is planning a broad Unix strategy that will be announced next year.

The Hitachi mainframe will run OSF-1 Unix and is intended for use as a host in client/server networks supporting Unix workstations, said Soji Endo, division manager for overseas operations at Hitachi. Although Hitachi's OSF Unix is not completely compatible with IBM's AIX Unix, he said, users can buy OSF software tools to make it AIX-compatible.

Hitachi and IBM/Japan have agreed to cooperate on Unix development for the Japanese market. Viewed by some as potential trading partners, both companies belong to the Open Software Foundation (OSF) Unix standards body. Hitachi has given IBM/Japan a software development tool based on the OSF/Motif graphical user interface.

Hitachi's Unix systems will initially be sold in the U.S. and Europe, Hitachi said.

Amdahl and HDS hold allies in separate light

BY JEAN S. BOZMAN
C.W. STAFF

SAN FRANCISCO — In the computer industry, East meets West in Northern California. That is where Fujitsu Ltd. and Hitachi Ltd. hold stakes in U.S. computer vendors Amdahl Corp. and Hitachi Data Systems Corp. (HDS).

But Amdahl Chief Executive Officer John Lewis portrays his \$2 billion firm as an independent player in the global computer

market. He likes to say that Fujitsu and Amdahl use the same computer-component "bricks" to build their systems but adds that the resulting machines are quite different. Amdahl, he said, has 1,200 engineers who specify mainframe designs and manufacture the products in Sunnyvale, Calif., and in Dublin.

By combining a Unix operating system, UTS, and IBM systems software on the same machine, Amdahl may well be ahead of the mainframe pack in open



HDS' Moore plans on building the firm's infrastructure

systems, Lewis contended. "We've got a two-edged sword in our Amdahl mainframe

architecture," Lewis said. "We'll allow customers to run IBM's operating system or open systems Unix software. We're the only one that has one foot in the IBM world and the other in the open world and doesn't have an ax to grind," he said.

At Amdahl competitor HDS, the watchword is "building the infrastructure," CEO Gary Moore said.

"We're not trying to be cocky, because we're the smallest of the three in the U.S.," Moore said. "We had 30% growth in our first year of business, and we're trying to build an infrastructure that will give us the strength we need to grow at double-digit rates in the coming years."

HDS is beefing up its global direct-sales force, just as parent Hitachi builds additional CPU and disk-drive manufacturing capacity in Japan and Europe. "My owners are my parents," Moore said, noting that Hitachi owns 80% of HDS, while Electronic Data Systems Corp. owns 20%. "They are strong, they are committed, and one of my par-

ents does all the design and manufacture of my equipment."

At HDS, the next two years have been set aside for positioning rather than for growing at top speed. And there have been some bumps along the way for the 18-month-old firm. Moore readily admits that some HDS



Amdahl CEO Lewis sees his firm as an independent global player

customers have been frustrated this fall by delays in disk-drive shipments and by back orders on large-scale mainframes. "We installed as much equipment as we could with the field engineers and software engineers we had," Moore said.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1988 by CW Publishing Inc. All rights reserved. Computerworld can be purchased on 35 mm microfilm through University Microfilms Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: back issues, if available, may be purchased at \$2.00 per issue, plus postage. Call (800) 669-1002. Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$5.00 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. For Back issues contact Margaret McIndoe. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: \$2.00 a copy: U.S. — \$48 a year; Canada — \$110 a year; Central & So. America — \$130 (surface), \$250.00 (airmail) a year; Europe — \$195 a year; all other countries — \$295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

TRENDS

AS/400
MIGRATION

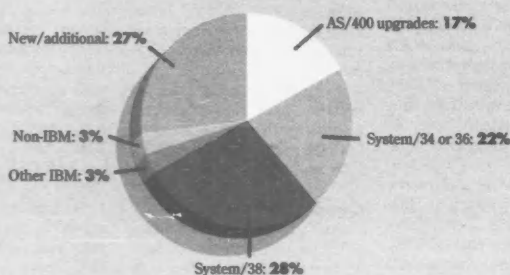
Successful from the start, IBM's AS/400 spells relief for established IBM shops

Systems being replaced by AS/400s

(U.S. sites)

Most AS/400s have found their way into System/38 sites, while 27% have gone to new sites or to those supplementing existing systems

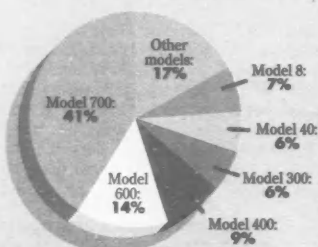
Percent of new/on-order AS/400s
(Respondent base: 1,534)

System/38 models
replaced by AS/400s

(U.S. sites)

System/38 Model 700 users are the largest group to have converted to AS/400s. Being the most powerful System/38 model, users needing to upgrade have no other choice but to change product lines

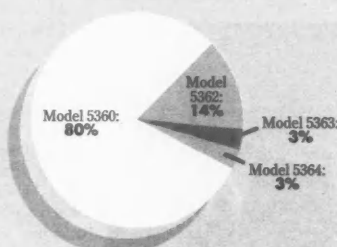
Percent of System/38s
(Respondent base: 430)

System/36 models
replaced by AS/400s

(U.S. sites)

System/36 Model 5360 users are also leaning toward the AS/400, particularly the mid-to-high-end models, feeling that upgrade options are limited

Percent of System/36s
(Respondent base: 345)



Source: Computer Intelligence, La Jolla, Calif.

CW Chart: Tom Monahan

NEXT WEEK

Special series: Women in IS. In the last half of the 1980s, some 245,000 computing jobs were opened to women. However, women in IS hold only about 30% of all computing jobs — and far less in IS management. High-level managers such as Mellon Bank Vice President Patricia Farwig are still rare. See In Depth for the first of a two-part series.



Scott Goldsmith/Black Star

Decisions, decisions: Should your organization use systems integrators, outsourcing companies or in-house talent? Manager's Journal takes a look at four companies that faced these decisions and went four separate ways — each reflective of the individual company's own business needs and information systems culture.

INSIDE LINES

Everybody's doing it

Not to be outdone by IBM or Unisys, DEC is also getting into data center facilities management. DEC has one outsourcing contract to run a Unilever DEC-based data center in the UK and is close to signing two similar deals in the U.S., said Tom Mitchell, corporate manager of DEC's Facilities Management Services Group. There are no plans at this point to seek contracts for multivendor data centers, however.

Time for Snowdevil?

We've received several calls in recent days from hackers who fear that federal law enforcers are preparing to launch Operation Sundevil II, a large-scale roundup of hackers suspected of carrying out computer crimes. We can't find any evidence to suggest this is true, but it is hard to overlook the fact that the Department of Justice executed Sundevil in early May, only days after Robert T. Morris was sentenced and public attention was still focused on the issue of computer crime. With the recent sentencing of three hackers in Atlanta, one of whom was accused of stealing a document about a 911 system, another raid may be in the offing to take advantage of the publicity.

Genius flares over Sun policy

Well-known hacker Richard Stallman, the advocate of free software who recently won a prestigious "genius award" from the MacArthur Foundation, is fuming over a Sun Microsystems announcement that would make X View free. The announcement purports to offer the software for free if it is linked with an applications program but Sun would require payment of royalties if the software is included with a computer, Stallman said. "We want to try it with Gnu [a Unix clone that Stallman and others at MIT are developing], but X View is not a program we can freely distribute," Stallman said.

Laptop flash

Hidden among Intel's Comdex/Fall '90 display of 14 prototype 80386SX-based notebook computers was one unidentified notebook object that featured both a 3½-in., 1.44M-byte floppy disk and a flash memory card drive. Industry sources say the box was made by Inventa, a Taiwanese OEM with close ties to Intel's Far Eastern group, and is due in the spring.

Hacker as sports agent

When federal agents raided the dorm room of Adam E. Grant, a student at Georgia Tech University, among the evidence they turned up to incriminate Grant for illegal hacking (see story page 1) was a credit bureau report on Bruce Dalrymple, a former Georgia Tech basketball star. According to government documents filed in the case, Grant tutored Dalrymple, who is now an assistant basketball coach at Georgia Tech.

Lotus to go

Lotus may lose more than one major 1-2-3 installation to the competition because of its hard-line "one machine, one license" policy. In reply to several letters of complaint, this month's issue of *Lotus Magazine* published an "editor's reply" reaffirming that users who want to take 1-2-3 home or on the road must first "de-install" the software from their office PCs — or buy a second license. This has caused an IS manager to begin thinking seriously of converting more than a thousand 1-2-3 users to "a vendor that takes a more practical, 'use it like a book' approach to licensing."

Marketing expertise. The party's over, for U.S. Robotics, Inc., and that means good news for next year, said Casey Cowell, founder and chairman of the Skokie, Ill.-based modem maker. Cowell told an audience at the seventh annual Illinois High Tech Entrepreneur Awards dinner that the number of hot dogs consumed at its Comdex/Fall '90 Monday Night Football party has been an accurate indicator of how the company will fare the following year. Party goers pushed down 20% more dogs this year than last. Dogs may be one apt way to gauge the economy these days, but if you are aware of bright technological lights on the horizon, phone them in to News Editor Pete Bartolik at (800) 343-6474, message COMPUTERWORLD on MCI Mail or send a fax to (508) 875-8931.



Is your fractional T-1 network too confining?

**Only AT&T ACCUNET®
Spectrum of Digital Services
offers you the exact capacity and
bandwidth you need to more
than 500 locations nationwide.**

Choose AT&T as your fractional T-1 vendor and you won't be locked into a network that limits your options. Because with more than 500 locations nationwide, AT&T's ACCUNET Spectrum of Digital Services (ASDS) gives you the freedom to send voice, data and images to more locations than anyone else.

And that's not the only way you benefit from ASDS' extensive network. Along with more locations, we also have many more back-up routes available through our diversity options. Which means ASDS can also provide protection for your critical applications like no one else.

For most businesses ASDS' extensive network translates into lower access charges, too. That's because we're closer to more customers than our competitors.

You won't find an easier service to hook into, either. Whether you have Ana-

log Voice Grade Private Line, ACCUNET T1.5 or single channel digital access at 96 or 56 kbps, getting access to ASDS couldn't be simpler.

So if you're feeling cramped by your network's reach, give us a call. We've got just the thing to break you out.

Service. Another AT&T advantage.

For more information on AT&T's ACCUNET Spectrum of Digital Services, call your AT&T Account Executive or 1 800 247-1212, Ext. 107.



AT&T

The right choice.

Presenting The Most Advanced, Integrated And Automated Production Control In The World.

Computers are too fast.

Humans are too human.

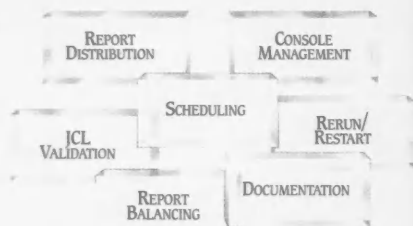
And life is too short.

It's time to automate your production control process.

By automating all of the manual, repetitive, error-prone tasks involved with production control you'll not only save lots of time, money and aggravation, but you'll also be able to achieve and maintain optimum service levels.

So the question really isn't whether to automate—it's how? That answer is easy.

CA-UNIPACK®/APC from Computer Associates.



*Only CA-UNIPACK/APC
can integrate and automate every
aspect of the production control process.*

It's the most advanced, and integrated package in the industry and the only one that delivers a single, comprehensive solution.

CA-UNIPACK/APC covers every aspect of automating the production control processes including: automatic workload scheduling, automatic console message processing, automatic rerun/restart, automatic report, balancing, automatic report manipulation and distribution, and JCL validation.



*CA's Computing
Architecture For
The 90s protects
and enhances the
value of every CA
software solution.*

And now, with our Computing Architecture For The 90s, CA-UNIPACK/APC can deliver even higher levels of integration and provide total data center automation by working seamlessly with other CA-UNIPACKs that automate Storage, Security, Performance Management, and Data Center Administration.

To find out more about how you can raise your service levels and eliminate everything that's slowing you down dial 1-800-645-3003.

Call today.
Time's
a-wasting.

**COMPUTER
ASSOCIATES**
Software superior by design.

